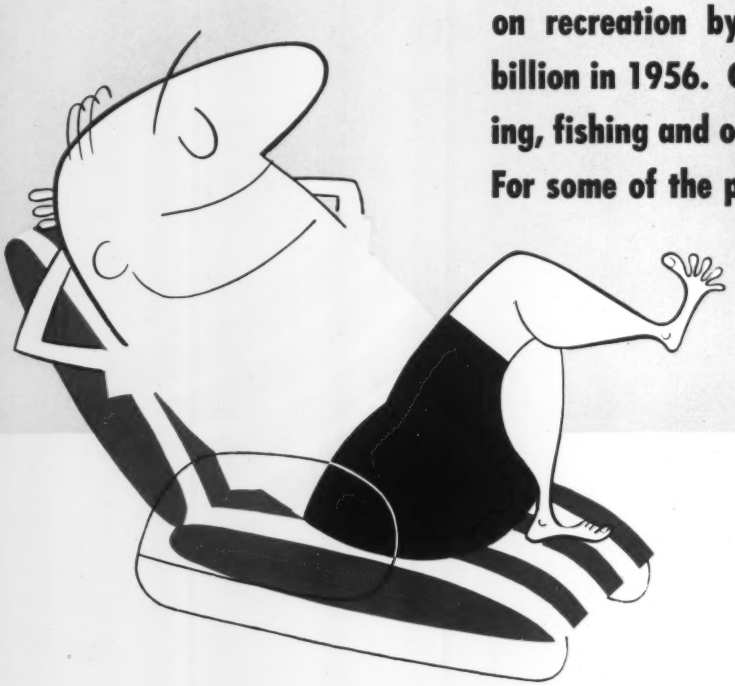
JULY 29, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

The Leisure Market

Americans will spend nearly $20 billion annually on recreation by 1962, compared with $14.3 billion in 1956. Can you share in selling the golfing, fishing and other equipment for that market? For some of the potentials, see page 71



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✔ Kaiser Steel Builds To Meet Future . . . page 165

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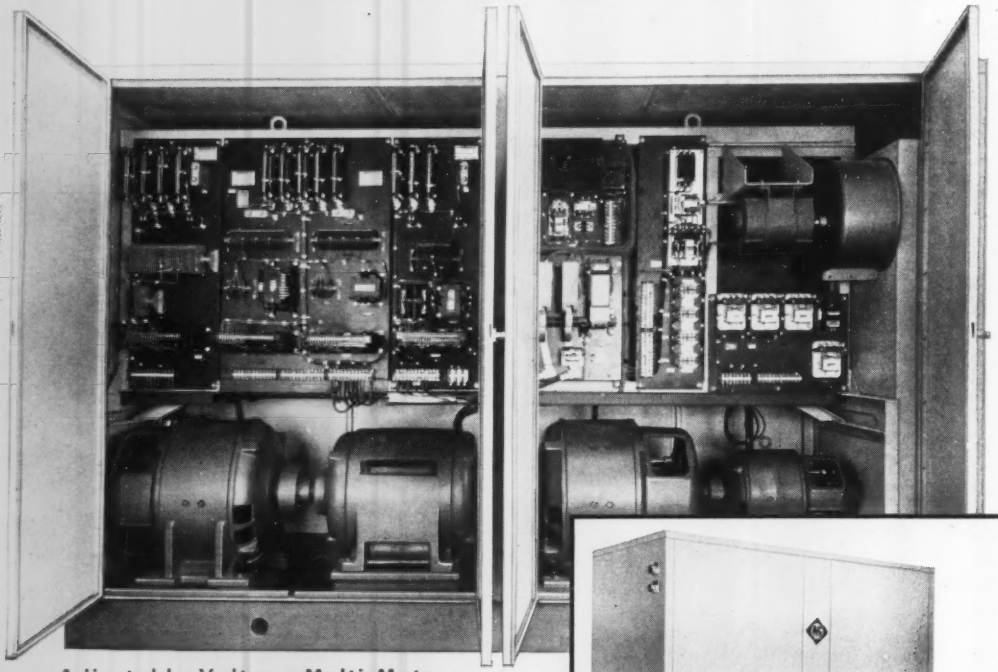
There's MORE dependable speed control

- high response
- high shock resistance
- no fragile parts
- no maintenance



Adjustable Voltage Multi-Motor Package Drive used with heat flattening and coating equipment. Unit features magnetic amplifier control of tension and strip speed.

Size 3 Adjustable Voltage Power Unit rated 30 hp, of standard construction. Magnetic amplifier excitation provided.

Every one of the design features of the Allis-Chalmers Adjustable Voltage Package Drive assures you an easy, dependable means of power conversion.

Key to Package Drive dependability is the use of a magnetic amplifier to excite the field of the power unit m-g set. Sturdy and simple, this amplifier has no moving parts to wear out . . . no fragile components to be affected by vibrations. AND — there's no wasteful "warm-up" time needed. At the turn of a dial, you get immediate speed control.

Cost-saving assembly

M-g set and control components are assembled in the power unit enclosure at the factory — saving you installation costs. Enclosures used for 30 through 200-hp units are completely collapsible and may be easily disassembled without loss of rigidity. Larger units have separately driven blowers to provide positive ventilation and pressure even when unit is idle.

Available in units from 5 to 200 hp, the package drive is ideal for any application requiring adjustable speed. Contact your nearby Allis-Chalmers sales office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5299

XXII

This is the twenty-second of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Normalizing Alloy Steels

There are several forms of heat-treatment commonly employed in the processing of alloy steels. Each in its own way modifies the mechanical properties and structures of steel, and each is chosen with a definite objective in mind. The five usual forms of treatment are normalizing, annealing, spheroidize-annealing, quenching and tempering, and stress-relieving.

In this particular discussion, let us consider briefly the purposes and effects of normalizing.

Normalizing is an operation in which the steel is heated to approximately 100 deg F above the upper transformation range, then cooled in still or agitated air. The basic purpose is to refine the prior structure produced by variations in finishing temperatures encountered in rolling or forging. The structure resulting from normalizing, being more uniform, will help create improved mechanical properties when the steel is subsequently reheated, liquid-quenched, and tempered.

There are times when large steel parts (heavy forgings, for example) cannot be liquid-quenched because of their size. In cases of this nature, the heat-treatment must consist of single or multiple normalizing followed by tempering.

High-temperature normalizing is sometimes used for grain-coarsening low-carbon alloy steels to promote machinability. (In high-temperature normalizing, steel is heated to more than 100 deg F above the upper transformation range.) At times it is possible to machine a steel in the air-cooled condition, the governing factor being the alloy content. However, the highly alloyed analyses may require annealing or tempering after normalizing, to decrease the hardness.

It is essential, when normalizing is employed, that free circulation of still or agitated air be provided. When air-cooling of individual bars or forgings is not practicable, the furnace charge should provide for some means of separation, such as racks or spacers.

If you would care to know more about normalizing, or any other phase of heat-treating, you are invited to consult with Bethlehem metallurgists. They have had long experience in such matters, and they know how each treating method affects the various alloy steels. They are always glad to give you any help you need.

And when next in the market, please remember that Bethlehem makes the full range of AISI standard alloy steels, as well as special-analysis steels and all carbon grades. We can furnish what you need.

If you would like reprints of this series of advertisements from No. I through No. XX, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The first 20 subjects in the series are now available in a handy 36-page booklet, and we shall be glad to send you a free copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

(Advertisement)

Resistance Welding Structural Members

SCIAKY

HELPS PUT PROFIT INTO MANUFACTURING

How Massey-Harris-Ferguson Achieves Mass Production Economy on Short Runs

Among manufacturers whose production requirements for any given part are limited, resistance welding is often regarded as an impractical method of fastening. They agree it is fine for mass production where tooling costs and setup time can be spread out over tens of thousands of parts. But for them, the cost of tooling and fixturing anything but the simplest assemblies would be uneconomical.

The Cost Research Department of Massey-Harris-Ferguson, as part of a program to reduce manufacturing costs, undertook an investigation of resistance welding. Under the direction of Mr. E. E. Hart, the investigation emphatically proved the economy and dependability of the process for a wide range of limited production assemblies.

Simplification of setup is key

The Cost Research Department reasoned that the key to the entire problem depended entirely on minimizing setup time, complete simplification of tooling and fixturing and positive dependability and consistency of the fabricating method. Mr. Hart was convinced proper resistance welding techniques would satisfy all these requirements. Subsequent developments and testing proved him right.

How the problem was solved

Basic tooling and fixturing was built right into the welder. (See Figs. 1 and 2.) The various assemblies required only the simplest tooling. Individual tooling for any assembly seldom cost as much as $75 per welding setup.

Setup time for any assembly was reduced to an average of 30 minutes. The performance of the welders themselves was carefully studied and recorded. Machine control setup for any assembly was reduced to a simple matter of the briefest reference to graphs.

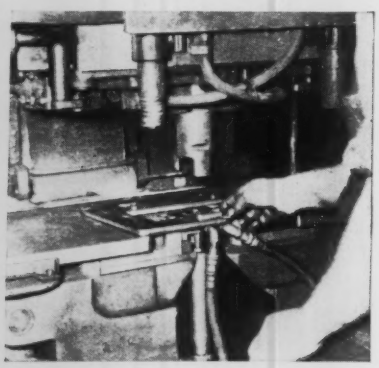


Fig. 1 Close-up of simple tooling required for a baler pick-up crank assembly.

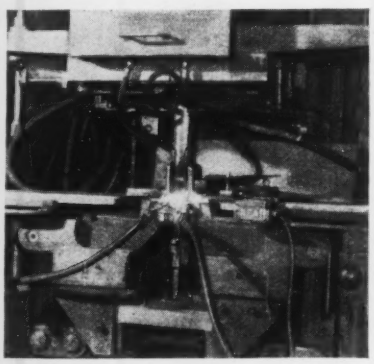


Fig. 2 Note universal fixturing table and simple dies used for welding a yoke assembly.

Cost reductions achieved

The large number of assemblies fabricated by resistance welding include many structural members. Castings, forgings and arc welded assemblies have been replaced with resistance welded assemblies of standard sheet or bar stock and screw machine products.

The cost of the resistance welded part averages 10 to 40% less than similar arc welded parts. The savings in time of the welding operation itself averages 60 to 90%. Castings and forgings suffer in comparison, with savings of over a dollar per unit not unusual.

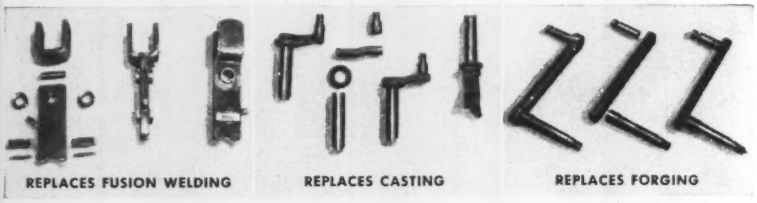


Fig. 3 Typical assemblies resistance welded on Sciaky equipment at M-H-F.

Quality welding essential

The success of such a program requires that the welders be capable of producing consistently high quality welds with maximum ease of control setup. Sciaky patented three phase welders easily meet these requirements.

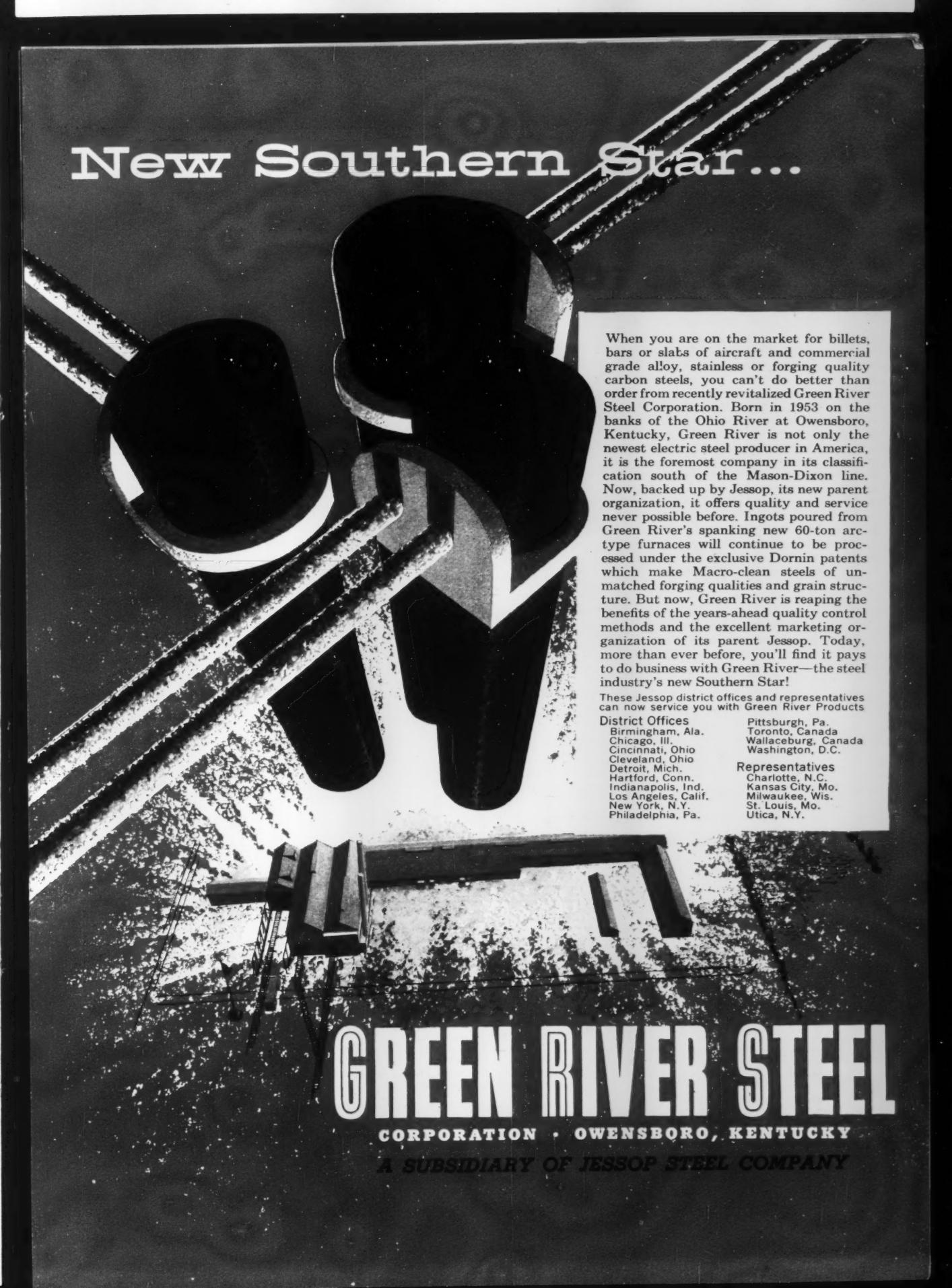
Detailed information available

Two bulletins are available giving more complete information on the Massey-Harris-Ferguson program. "Resistance Welding at Work," Vol. 5, No. 1 (16 pages), gives data, including cost reductions, on 28 different M-H-F assemblies. An engineering report on "Design Standards" (48 pages) gives full technical data on the eight basic weld types employed. Copies of either or both bulletins are available on request.

Write today, mentioning the information you would like to receive. There is no obligation. Sciaky Bros., Inc., 4909 W. 67th St., Chicago 38, Ill. POrtsmouth 7-5600.

DO YOU HAVE A RESEARCH PROBLEM?

Facilities of the Sciaky Research Division at Los Angeles, California, are available for contract research to answer resistance welding problems. Housed in a 15,000 sq. ft. building, these facilities include an experienced engineering staff, a complete range of the most advanced resistance welding machines including the largest in the world and a laboratory equipped for metallography, chemistry, electronics, photography and testing as applied to resistance welding. Write for further information and ask for the 20 page Research Division brochure.


New Southern Star...
When you are on the market for billets, bars or slabs of aircraft and commercial grade alloy, stainless or forging quality carbon steels, you can't do better than order from recently revitalized Green River Steel Corporation. Born in 1953 on the banks of the Ohio River at Owensboro, Kentucky, Green River is not only the newest electric steel producer in America, it is the foremost company in its classification south of the Mason-Dixon line. Now, backed up by Jessop, its new parent organization, it offers quality and service never possible before. Ingots poured from Green River's spanking new 60-ton arc-type furnaces will continue to be processed under the exclusive Dornin patents which make Macro-clean steels of unmatched forging qualities and grain structure. But now, Green River is reaping the benefits of the years-ahead quality control methods and the excellent marketing organization of its parent Jessop. Today, more than ever before, you'll find it pays to do business with Green River—the steel industry's new Southern Star!
These Jessop district offices and representatives can now service you with Green River Products
District Offices
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Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
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New York, N.Y.
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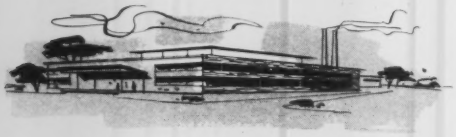
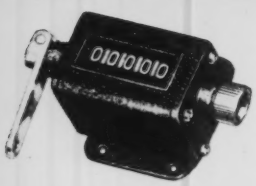


No Two Plants are alike...

but all can count on VEEDER-ROOT

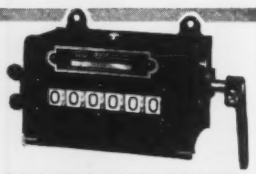
Sure, everybody's manufacturing problems are "different." But when these problems involve mechanical or electrical *Count*rol, they can *all* get the right answer from the same man . . . the Veeder-Root Distributor.

You will find that this man is tops in his field. He knows industry, and he knows how to adapt and apply standard Veeder-Root Counters to all types of production machines and processes, to give you exactly the facts-in-figures you need. If it's a question of quality, volume, cost inventory, production, wage or incentive payment, remember that *you're never sure unless you count*. And remember that the man you can always count *on* is your Veeder-Root Distributor. If you don't know who he is, just drop a line to D. G. Dresser, Veeder-Root Inc., Hartford 2, Conn.



SMALL RESET COUNTER

A compact, rugged reset counter for moderate duty in parts inspection, quality control, conveyors, machine tools, light presses, etc.
Dimensions: 1¾" long, 1 19/64" high, 1 7/16" wide.
Speed: Up to 1000 counts per minute.



BOX-TYPE RESET COUNTER

For punch press installations, conveyors, metal-working equipment, die casting, plastic-molding, rivet, spring and wire machining, or any installation requiring a heavy duty counter.
Dimensions: 4¼" long, 2 5/32" high, 3⅜" wide.
Speed: 500 counts per minute.

RESET MAGNETIC COUNTER

For remote indication of machine operation from plant to office.
Dimensions: 3 15/16" long, 2½" high, 1⅝" wide.
Speed: Up to 1000 counts per minute.
Coils: 110V-AC are standard. Other voltages are available. Panel mounting feature also available.

HAND TALLY

For quick spot-checks of production or performance.
Dimensions: 1 17/64" long (to end of reset knob), 1¾" deep, 2" high.
Counts one for each depression of the thumb lever, and resets to zero by a turn of the knob.

CLUTCH SPEED COUNTER

For checking to make sure that the machine is operating at the required R.P.M.
Dimensions: 3¼" long, ⅞" max. diameter. Non-Reset.
Internal clutch operates counter only when rubber tip is pressed against the shaft.

Everyone can count on

VEEDER-ROOT

"The Name that Counts"

Hartford, Conn. • Greenville, S. C.
Chicago • New York • Los Angeles
San Francisco • Montreal
Offices and Agents in Principal Cities

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The Metalworking Weekly

July 29, 1957
Vol. 141 No. 5

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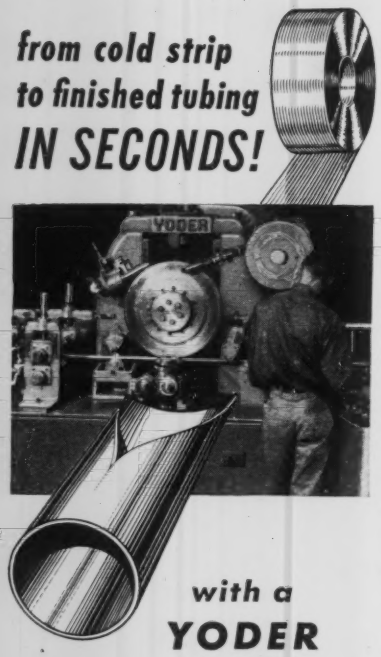
from cold strip to finished tubing
IN SECONDS!



with a
YODER
ELECTRIC-WELD
TUBE MILL

One of the fastest . . . and one of the least expensive . . . methods of making steel tubing is with a Yoder Electric-Weld Tube Mill. The Yoder method eliminates the need for time-consuming heat treatments and costly conditioning furnaces for most tube needs. Scrap losses, too, are far lower than any other method . . . usually less than 2%.

The Yoder Type-M Mill shown above is operated by one man and a helper. Coiled strip on this mill is continuously cold-roll formed, welded and cut to required lengths in a matter of seconds . . . at speeds up to 340 f.p.m. The quality of the resulting tube is *constantly* better than the requirements of commercial standards. This is one of many reasons why manufacturers and users of tubing the world over are using more Yoder mills than all other makes combined.

If your business requires pipe and tubing, ferrous or non-ferrous, in sizes from ¼-inch up to 26-inch diameter, Yoder can supply the engineering service and machines to produce it faster and better for less! For complete details, write for the Yoder Tube Mill Manual. It's yours for the asking.

THE YODER COMPANY
5502 Walworth Ave. • Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING
PIPE AND TUBE MILLS
(ferrous or non-ferrous)

behind the scenes

New Metal Market

Man is such a remarkable animal it pays to stop and consider him once in a while. If you study him seriously, you are likely to grow confused, yet if you look for something funny in his history, you may wind up weeping. Let us take you by the hand and conduct you through time and space to a forest clearing, where we may observe some families of early men. They are romping about in the sun, scratching themselves, combing each other's hair, rooting under rocks and logs for insects and grubs and just plain relaxing. The old man's name is Fred. Let's interview him.

"Fred, we understand you are the head of a group of Early Men. What do you people do with yourselves every day? What's with this primitive bit, anyway?"

Fred stares at us coldly through two little hazel eyes set ¼-in. apart. "We sleep indoors, and eat outdoors, and wear as little as we have to, and work when there is no escape from it, and enjoy all the fun we can. Anything wrong with that?"

Indeed there isn't. Darned if the great American Public isn't occupying itself in about the same way hundreds of years, religions, wars and cultures later. We sleep indoors, eat outdoors, wear less all the time, work as little as possible and keep demanding more time for recreation. Now it's a matter of individual taste to submit that modern civilization, the crowning success of evolution, may be measured by Ivy League caps, Bermuda shorts, Bikini sun suits, chef's hats and aprons and sideburns extending to the armpits, but the metalworking world doesn't doubt it for a moment. Persons outfitted as described make up the new "Leisure Market," and you can read all about it on page 71.

This tremendous consumer of metals snuck up on us when we weren't looking; it snuck up on weekends, and long summer evenings, and shorter working days, and longer vacations, and on suburban developments. More people had more money to spend, and more time to spend it, so they began to spend it on leisure enjoyment: Metal porch and lawn furniture, tools, sports equipment, vehicles, boats—why, there is almost no end to the stuff Fred's modern prototypes clamor for today.

Producers, fabricators and distributors of metal goods for the Leisure Market may be inclined to grow philosophical and misty eyed over man's march onward and upward, step by step with the development of metals. We can go along proudly with the vision of a shaggy man with an iron spear, a brawny man with a bronze sword, a lean man with a steel rifle—but when we picture a paunchy man in shorts wearing a sport cap and sitting in a tube-frame chair, we don't get misty eyed: We choke.

For the Circular File

This might be a good time to catch up with our puzzles. C. S. Lohmann, Hart & Cooley Mfg. Co., Holland, Mich., sent the first correct answer to the enigma of the wine drinking bums. He cleverly deduced that one of the inebriates would be obliged to buy 20 pints of Rhoma. No. 2, therefore, bought 3 pints of Rhama, 12 of Rhoma and 5 of Rhuma; No. 3 bought 6 pints of Rhama, 4 of Rhoma and 10 of Rhuma. It's a shame we can't list all the respondents who claimed they were right, but you'd be surprised how conservative the editors are with this space.

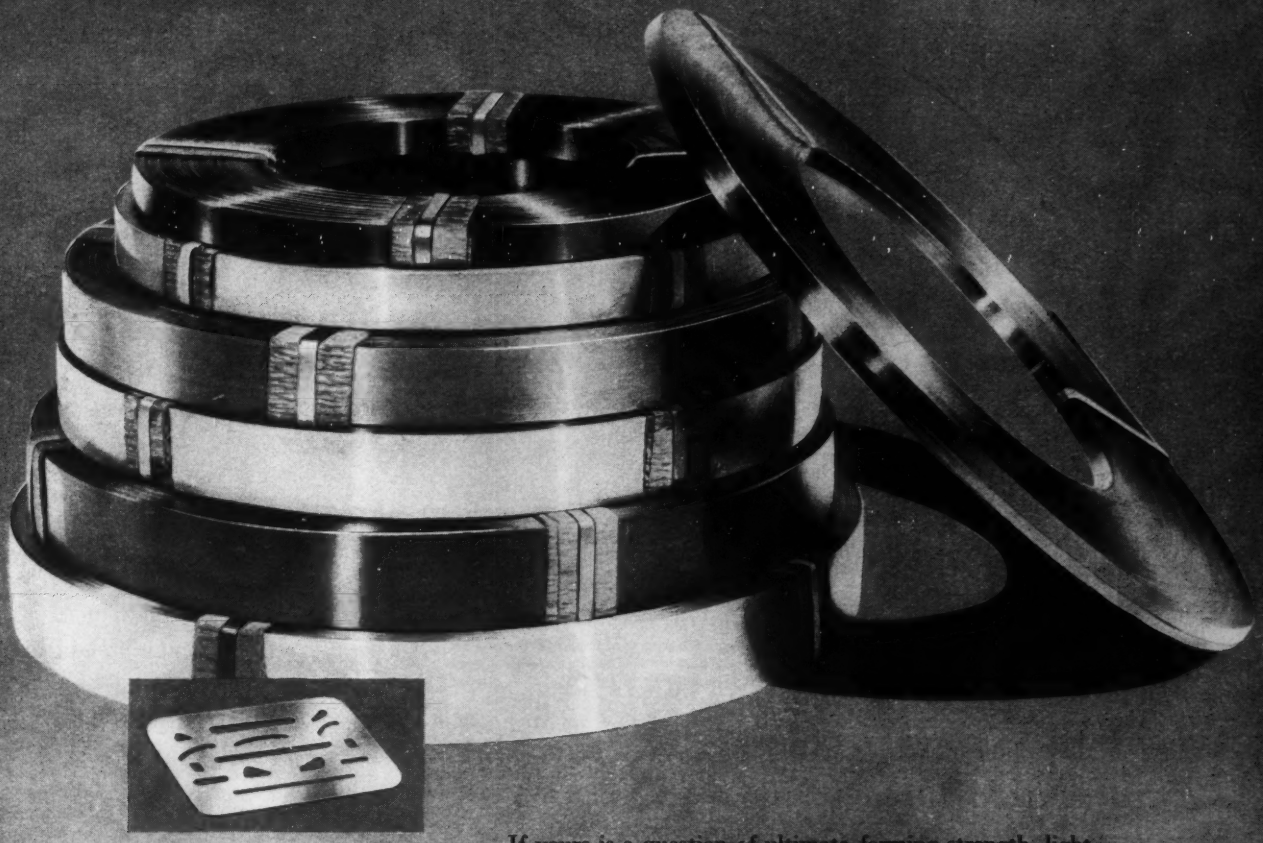
Hallock C. Campbell, director of research, Arcos Corp., Philadelphia, and Frank C. Berger, Sheboygan, Wis., sent correct answers to the digit problem (471) that arrived in a dead heat. A. Nonimous, Seattle; Charlsie & Friends, General Steel Castings, Granite City, Ill., and three or four others were kind enough to express interest in an item that ran here July 1, called "Star Spangled Stuff." This is our cue to blush prettily and be the first to wish everyone a Happy Pioneer Day, which is a holiday in Utah, but something tells us we are a week late.

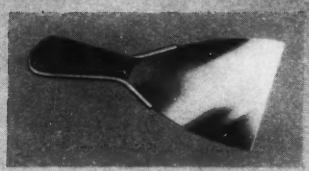
Oh, well—Say, does anybody know what the first welding job in America was?

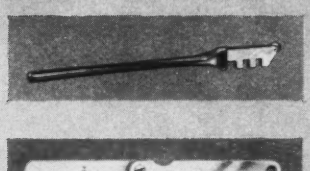
Shrdlu

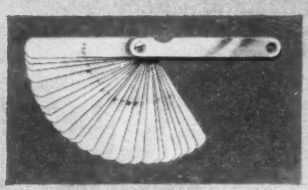
(Metalworking Outlook—Page 65)

The Trend is to "Tailored" Steels

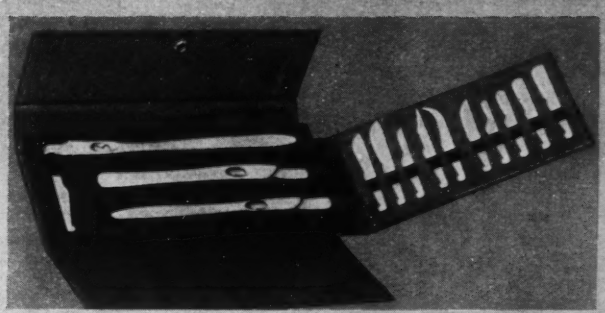








If yours is a question of ultimate forming strength, light weight, uniform thickness, finish and structure, Wallace Barnes specialty strip steels are the answer. Meeting exacting specifications is an everyday occurrence in our modern mill where precision methods count more than mass production. Prove to yourself how "made-to-measure" steels meet modern design and fabricating requirements. Send for our steel story.



WALLACE BARNES STEEL DIVISION

ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

ALSO MAKERS OF SPRINGS • WIRE FORMS • SMALL STAMPINGS

DIVISIONS OF ASSOCIATED SPRING CORPORATION — COAST TO COAST

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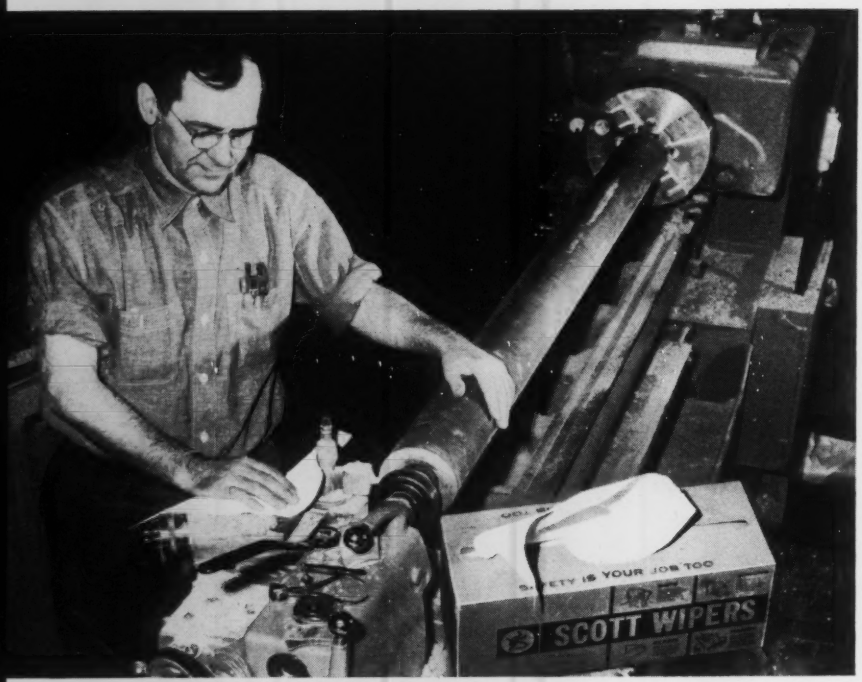


Highly absorbent Scott Wipers* are Perf-embossed® . . . a special process that imparts thorough cleaning action, faster liquid absorption. They're 2-ply paper, welded for strength—ideal for jobs like wiping this high speed lathe.

*PATENT PENDING

WIPER PROBLEM? Look what Continental-Diamond Fibre did with Scott Wipers!

Continental-Diamond Fibre Corporation, Newark, Delaware, makes products for the electrical and communications industries. Wanting to get away from unsightly piles of oily cloths—and always conscious of the hazards involved in using cloths around high speed machinery—management switched to Scott Wipers.

Result: a saving of $2,000 a year, better control of wiping materials, cleaner, neater plant appearance, reduced accident rate. Scott Wipers, fresh from the box, carry no foreign particles to cut or scratch—are always handy to each work station. Disposal is easy, in nearby receptacles.

Scott Wipers are found to be ideal for nearly 95% of all wiping jobs here. They're used on milling machines, lathes, drills, punch presses, on machines that do skiving, extruding, slitting and winding.

For more facts on lint-free, efficient Scott Wipers, call your local Scott representative. Or write Scott Paper Company, Department S-77, Chester, Pennsylvania.

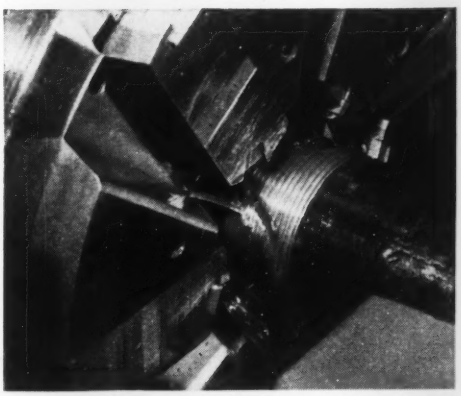
SCOTT PAPER COMPANY

Makers of the famous Scott paper products you use in your home. Consult TV schedules for Scott's program, "Father Knows Best."

JOE IS DETERMINED TO SEE EVERY STEP OF THAT PRECISION CUTTING JOB.
WE'D SAVE MONEY BY GETTING HIM SOME TRANSPARENT SUNICUT.
LOCKE

For precision cutting...

TRANSPARENT SUNICUT OILS ASSURE YOU GOOD VISIBILITY, PEAK PRODUCTION



Transparent Sunicut oils assure excellent finish in critical operations at close tolerances. Good visibility speeds production.

Transparent Sunicut® oils, including heavy-duty and dual-purpose oils, are available in many grades to suit your specific needs. They give outstanding results...especially where precision cutting is required.

Their transparency takes the "blinders" from work that needs close watching, permitting close product control, faster production, lower unit cost. Machine operators like Sunicut's "cleanliness." Most important, *transparent Sunicut oils assure you of good finishes.*

For full information about Sunicut cutting oils, call your Sun representative, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-7.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

Philadelphia 3, Pa.

In Canada: Sun Oil Company Limited, Toronto and Montreal

SUNOCO®

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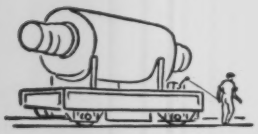
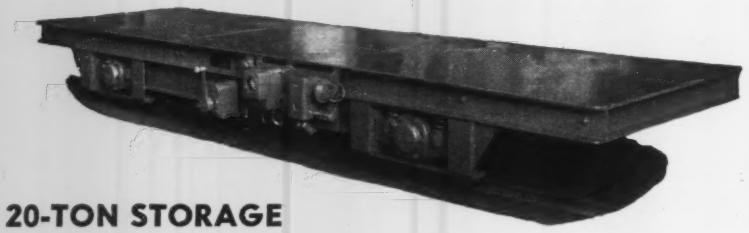
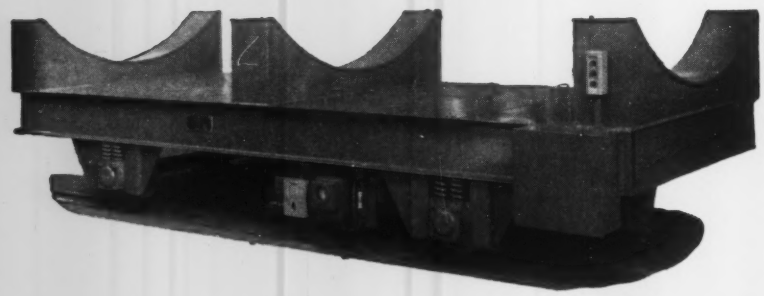
ATLAS SAFETY TYPE "SHORT HAUL" TRANSFERS



Atlas Safety-Type Transfers provide safe, low-cost service. Available with gas or diesel-electric, cable reel, or storage battery power. Atlas Transfers handle any type of load . . . and the heavier the load, the greater the savings.



20-TON STORAGE BATTERY FLAT CAR



20-TON STORAGE BATTERY WITH CRADLE FOR PIPE

Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

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LETTERS TO THE EDITORS

Article Hits Nail on Head

We have bought space in your publication for many years and believe the magazine has been quite beneficial in selling our product.

In reading the June 17 issue, I find that your article, "Managing Our Markets" (page 93), hits the nail right on the head. Please send a dozen copies so our executives can have copies for themselves.

Harry G. Epperson
Director of Advertising
Dempster Bros. Inc.
Knoxville, Tenn.

Matter of Redundancy

I have always read your editorials with interest, and I believe this is the first time you have let me down in my admiration for your correct use of the English language.

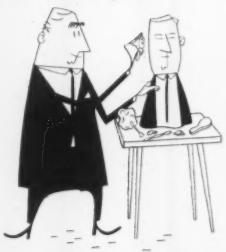
You speak of "component parts" in your editorial, "A Dangerous Precedent" (June 10, page 97). I believe that is a redundancy. A component is a part, and saying component parts is like saying "partlike parts."

I believe this double use of "component parts" originated in Washington and is some of the "gobbledegook" that bureaucrats love to put in reports.

I sincerely feel it has no place in a technical article or an editorial of as high a grade magazine as STEEL.

G. E. Hieber
Assistant Chief Engineer
Landis Machine Co.
Waynesboro, Pa.

Building of People



I have been reading your 1957 Program for Management series with considerable interest and admiration. I think the articles are of great help, particularly to the small and medium size companies.

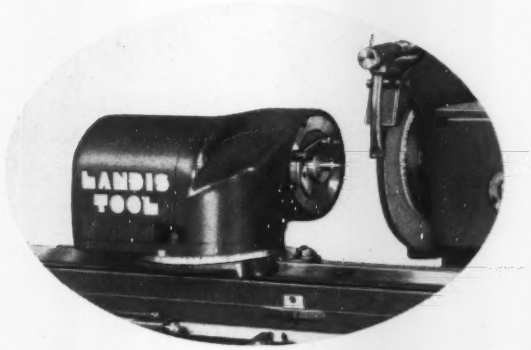
In each area you have covered—such as "The Care and Feeding of the Junior Executive" (Feb. 11, page 93) and "Grooming Middle Managers" (Mar. 18, page 93)—you have presented them on a well-organized basis and in such a way that one can take the principles developed and apply them to his own business.

The more we can get each individual company to do a better job of upgrading its own people, the less we will see pirating from other companies, not only in the engineering field but also in management. The great responsibility of management is the building of people.

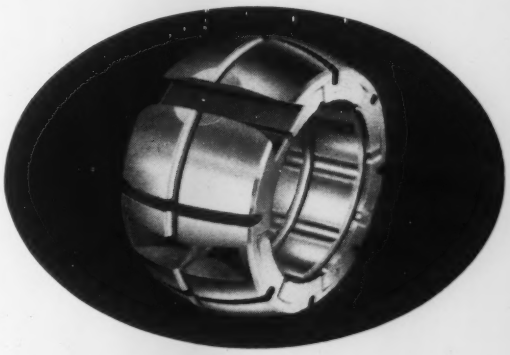
Your article, "Business Failures

(Please turn to page 12)

Low cost general purpose grinder with 2 exclusive "big grinder" features...



Variable speed headstock... compact design with only two revolving parts. Can be swiveled for angle or face grinding.

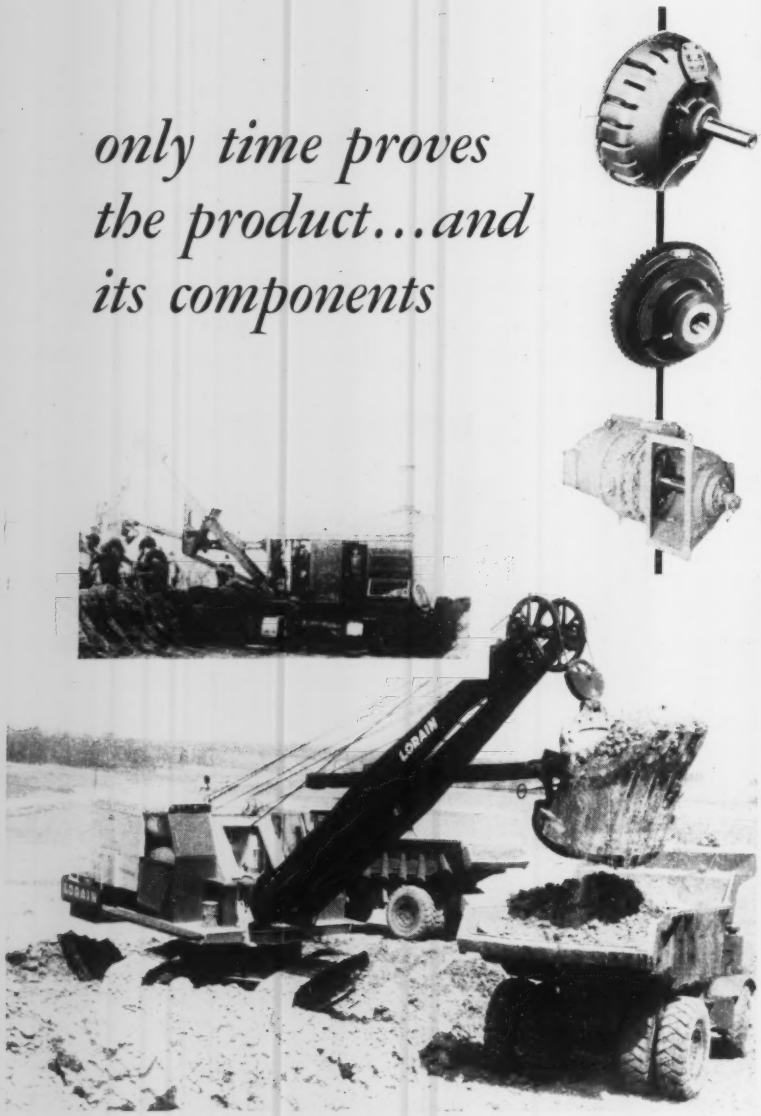


Microsphere bearings... close running clearance of Landis Microsphere spindle bearings gives faster spark-out, accurate, quick response to wheel feed.

LANDIS 12" x 28" Grindwell Universal ... compact, precision grinder for manufacturing, maintenance, toolroom and training.

LANDIS
precision grinders
LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

only time proves the product...and its components



The old steam shovel shown in the inset was built many years ago by The Thew Shovel Co., one of today's leading manufacturers of powered excavators and cranes. This model was a common sight on early construction projects and was in common use during the period of transition from steam power to internal combustion engines . . . when Thew Shovel began using Twin Disc products.

Today, Thew continues with Twin Disc products . . . and uses Twin Disc Model CL Clutches, Fluid Power Take-offs and both Three-Stage and Single-Stage Torque Converters in various Thew machines.

Since its founding, Twin Disc has specialized *solely* in building industrial friction and fluid drives for heavy-duty machinery. Twin Disc Friction Clutches are currently available to 1050 hp . . . Fluid Couplings to 850 hp . . . Three-Stage Torque Converters to 1000 hp . . . and Single-Stage Torque Converters to 212 hp. Write Twin Disc Clutch Company, Racine, Wisconsin: Hydraulic Division, Rockford, Illinois.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC

Friction Clutches and Fluid Drives

LETTERS

(Concluded from page 10)

Mount" (Apr. 22, page 56), was most timely; and, again, we see the most outstanding reason is incompetence.

I would appreciate a complete set of reprints for my files.

Walter G. Koch
Rural Route 8
Browning Road
Evansville, Ind.

Inventory-Production Ratio

In the article, "Inventory Management" (May 13, page 109), you refer several places to a relationship of inventory increases as related to production volume increases.

I interpret your relation as:

$\Delta \text{Inventory} \sim \sqrt{\Delta \text{Product Volume}}$

For product A, the product volume increase is 9; the $\sqrt{}$ is 3. Therefore, it would seem the new inventory is 2 (old inventory) plus 3 or 5. Please straighten this out.

Elmer H. Burack
Federal Tool Corp.
Chicago

• *The inventory-production volume relationship is a proportionate one. An inventory increase should be proportionate to the square root of the* factor *of increase in production volume.*

When a production volume of 3 jumps to 12, the factor *of increase is 4, although the physical increase is 9. We are interested in the factor, 4. Its square root is 2. So, 2 × 2 (old inventory) equals 4 (new inventory). We don't add in figuring this relationship; we multiply.*

Fresh Approach to Process

Kindly send two copies of the articles, "Today's Hottest Question: Materials for Use Above 1500°F?" (page 120) and "Choosing the Right Quench" (page 123), from the May 13 issue.

These useful articles are good examples of presentation of new information and a fresh approach to an old process.

M. Margolis
Chief Metallurgist
Engineering & Research Division
Walter Kidde & Co. Inc.
Belleville, N.J.

Query on Editorial

Your editorial, "Dilemma in Distribution" (June 17, page 51), was read with interest.

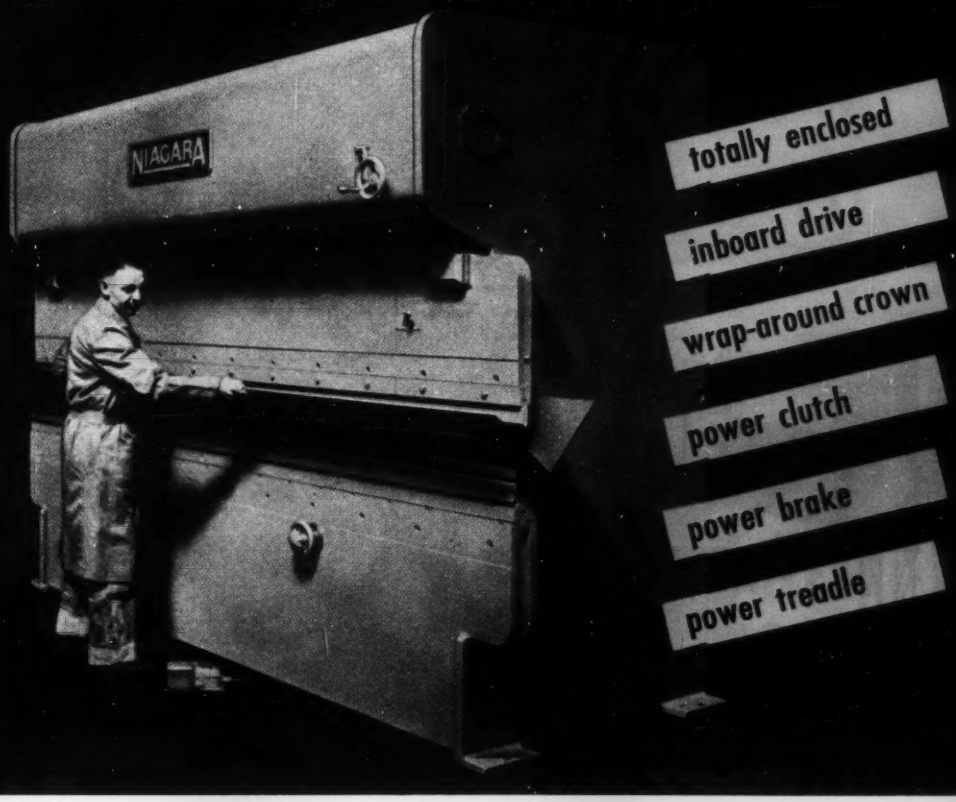
Have you figures which would indicate the percentage of business obtained by the outlets discussed in the second and third paragraphs? For example, of the $9 billion sales, what percentage was sold by industrial distributors?

E. Bytwerk
Manager
Marketing Department
Manning, Maxwell & Moore Inc.
Muskegon, Mich.

• *Percentagewise, the 19,000 independent distributors and agents divided up their $9 billion annual volume in this manner: Industrial (mill) distributors, 45 per cent; steel warehouses, 36; manufacturers' agents, 9; machine tool distributors, 8; and copper and brass warehouses, 2.*

There is some overlapping, but the precise extent is difficult to determine. Industrial distributors, for example, sell some metal and machine tools.

new clean-sweep styling and modern power features open the way to new production peaks



ALL NEW

- totally enclosed
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- wrap-around crown
- power clutch
- power brake
- power treadle

NIAGARA 30 AND 50 TON PRESS BRAKES*

HERE'S MEANINGFUL STREAMLINING . . . and at its very best! *Everything's inboard:* Motor, belts, flywheel, clutch, brake and gears . . . yes, even the connections, pitmans and ram adjustment mechanism. *Nothing protrudes!*

Resourceful designing has made it possible to provide heavier, deeper uprights with relatively no increase in floor space. Net result: A 50% deeper throat for larger work.

HERE'S PERFORMANCE that can't be matched! These all-new Niagara Press Brakes have a smoothness of action all their own. Niagara Power Features . . . Power Clutch, Power Brake, Power Treadle . . . assure easy, instant response to every command. The ram can be micro-jogged smoothly and softly to a layout line, or stopped on a dime at full speed!

Proved on mighty Niagara Presses, Niagara's Electro-Pneumatic Friction Clutch engages in a fraction of a second, disengages even faster, and *fails safe!* Featuring simplified construction, it's a low inertia, heavy duty unit that's designed to outperform and outlast any other press brake clutch. Friction plates automatically compensate for wear . . . no adjustment required.

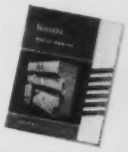
Spring applied, Niagara's powerful Air Releasing Brake can't fail for it does not depend on energy (air or electricity) to bring the machine to an immediate halt.

HERE'S RUGGEDNESS to take extreme loads in stride! Niagara's solid, all-welded steel one-piece frame with integral wrap-around crown provides maximum resistance to deflection. *There's nothing to work loose!* Utmost strength and rigidity are assured.

Straddle mounted between anti-friction bearings, hardened steel gears run in a sealed oil bath. Centralized pressure lubrication delivers oil to all main bearings, connection bearings and gibs with a single shot.

PREVIEW THESE ULTRA-NEW MACHINES

Find out what they can do for you by writing for Niagara's new, illustrated Bulletin 90 today.



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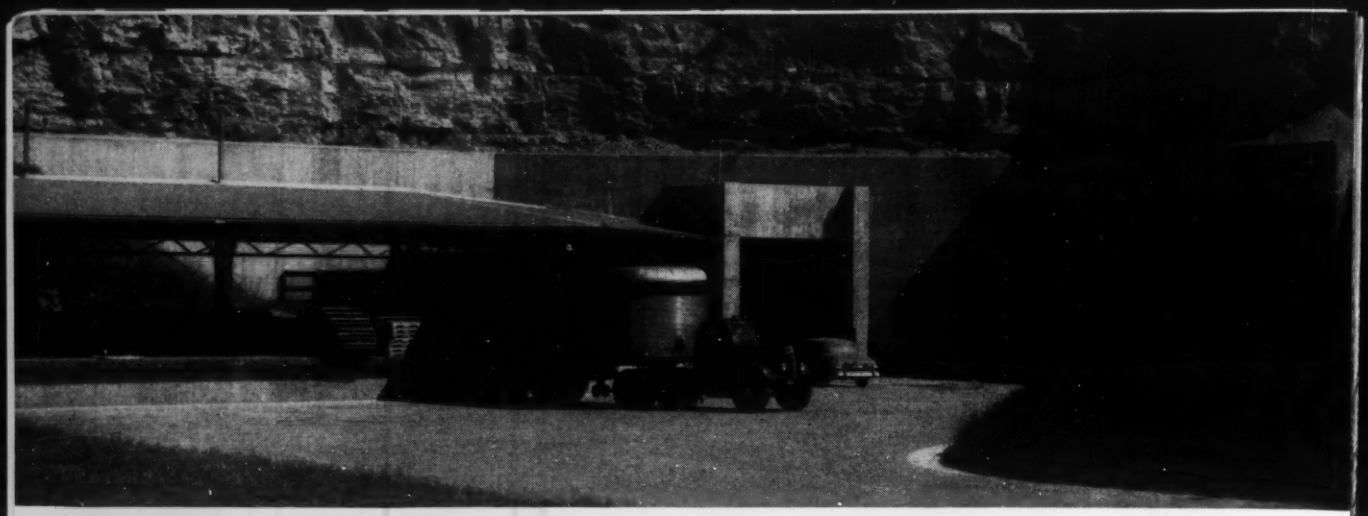


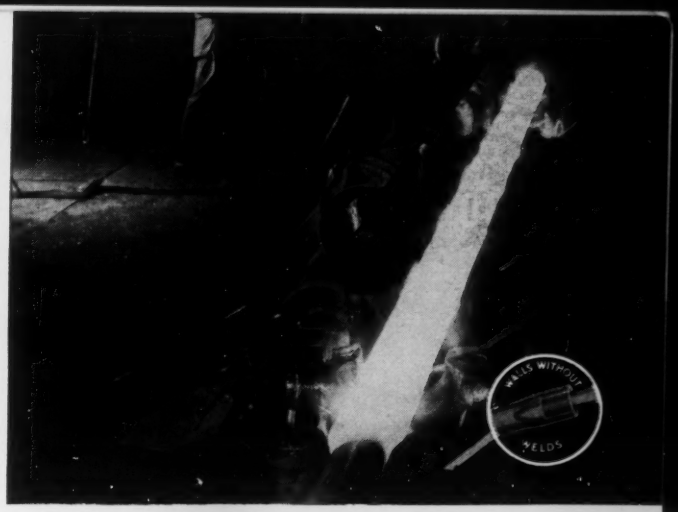
In the Refrigeration System of the Inland Cold Storage "cave" near Kansas City are more than three miles of National Seamless. Ranging from ⅜-inch to 10-inch dia., the pipe circulates brine and ammonia.

Backbone of a

Buck Equipment Corporation Hoisting Machines like this are available with towers up to 150 feet in height. Constructed of Shelby Seamless Mechanical Tubing, the sturdy, slender tower unfolds like a jack-knife—raises and lowers in just over 2 minutes. The platform zooms up its vertical track at 140 feet per minute.

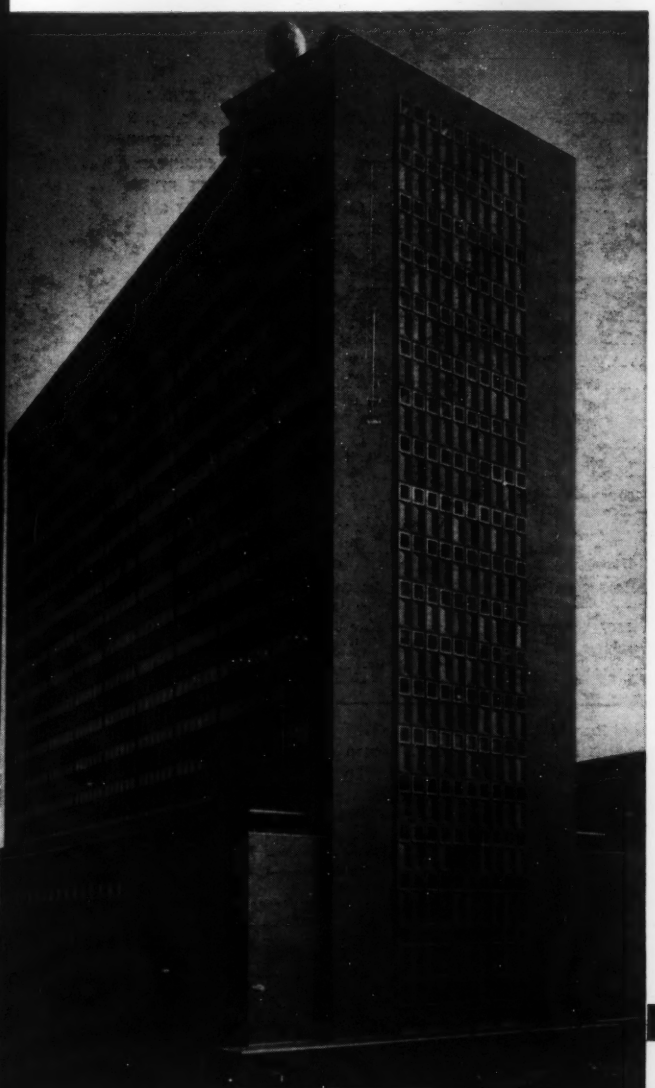
10,200 Tons of 10¾" National Seamless are being used in the world's first coal-carrying pipeline. A slurry mixture of coal and water will be pumped through the unique line at the rate of 1,200,000 tons per year. The line runs from Cadiz, Ohio to Cleveland Electric Illuminating Company's East Lake, Ohio, plant.

New England's Most Modern Power Station employed 25 miles, or 700 tons, of National Seamless Pipe in its construction. The Salem Harbor Station uses 250,000,000 gallons of sea water per day to condense steam for conversion to electric power. Annual output exceeds 1,000,000,000 kilowatt-hours.



The National Seamless Method of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No longitudinal welds . . . no weaknesses.

Hundred Industries . . .



NATIONAL SEAMLESS PIPE AND TUBES

Ever see a ton of bricks soaring up a thin vertical track of tubing at 140 feet a minute? Or a pipeline that carries coal from the mine to potential customers a hundred miles away? These and many more technical miracles are realities today—with the help of National Seamless Pipe and Tubes.

The versatility of National Seamless is evident everywhere. It can be versatile because it is *so strong, so safe, so workable.* Its uniformity and dimensional accuracy are unquestioned. And National Seamless is available in a wide range of steel analyses, wall thicknesses and diameters. Every foot is produced to exact standards by the world's largest manufacturer of tubular steel products.

National Seamless might be just the answer to your tubular problem. Get in touch with National Tube. We will be pleased to help you in any way we can.

The New Texas National Bank at Houston employs National Seamless Pipe in a wide range of sizes for its vast heating and air-conditioning system. Sizes from 4" to 12" O.D. are used for chill and hot water lines, while 14" O.D. pipe forms part of the steam-handling system. 16" pipe is used for carrying condenser water.

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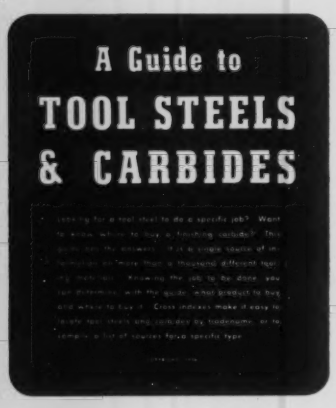
USS **NATIONAL SEAMLESS PIPE AND TUBES**

UNITED STATES STEEL



HERE'S HELP for your tooling problems

Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

40 PAGES

Copies of the Guide to Tool Steels & Carbides are available from Editorial Service, STEEL, Penton Bldg., Cleveland 13, O., at the following prices:

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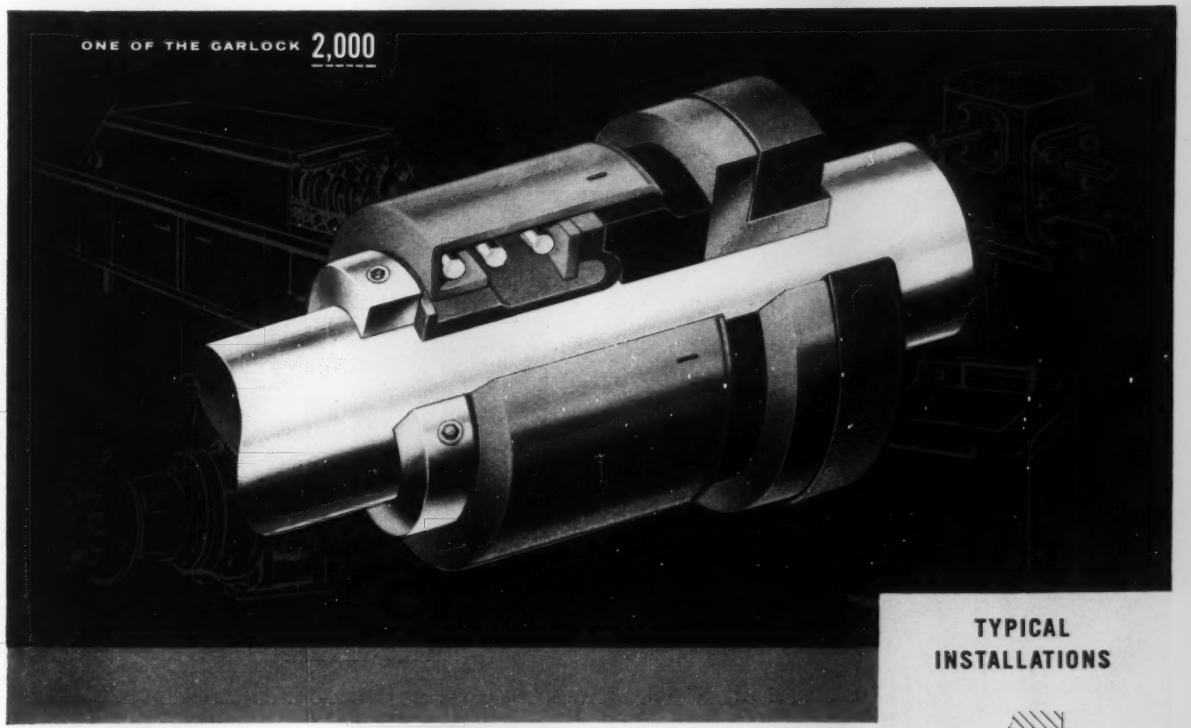

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Withstands temperatures to 212° F. with standard bellows or up to 400° F. with silicone rubber bellows . . . shaft speeds to 2000 fpm and higher depending on operating conditions. Sizes for 3/8" to 3" dia. shafts. Mechanical drive arrangement is engineered to eliminate slippage and simplify installation.

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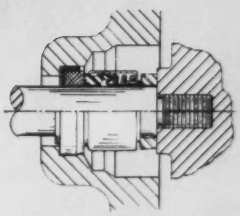
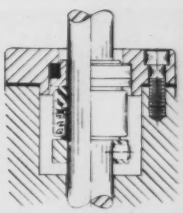
TYPICAL INSTALLATIONS



Centrifugal pump installation where stationary seat fits in housing and impeller provides stop for seal. A cup type vibration ring holds stationary seat. (Vibration ring design optional.)



Vertical shaft installation where lock-nut positions seal on shaft and stationary seat is in gland. A square vibration ring is used to hold stationary seat. (Vibration ring design optional.)

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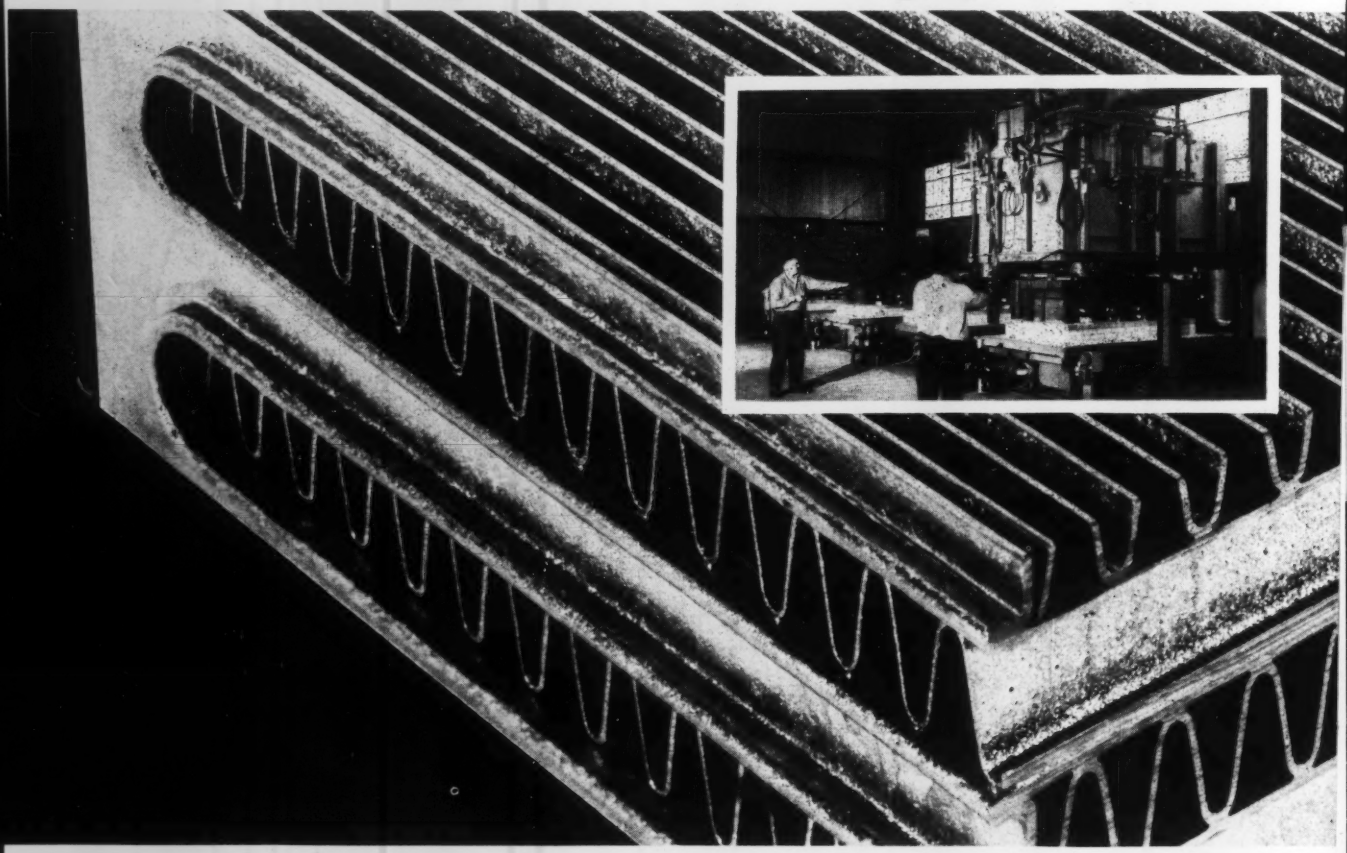
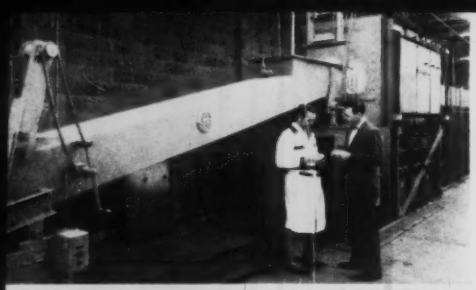
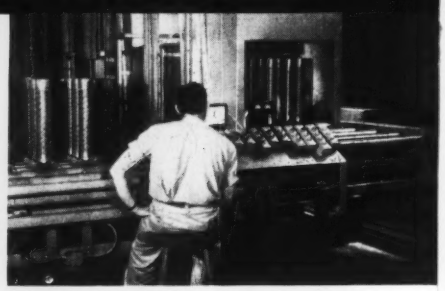
General Electric engineers complex brazing problem



OTHER TOUGH BRAZING PROBLEMS SOLVED BY GENERAL ELECTRIC . .



CONTINUOUS BRIGHT BRAZING of stainless-steel assemblies without flux, and bright annealing and hardening of stainless parts, make this General Electric hump-type furnace with alloy muffle a versatile tool at Specialty Steel Treating, Inc., Van Dyke, Michigan. Hump construction of this General Electric furnace saves atmosphere gas and provides bright, oxide-free work.



REDUCED COSTS in assembly of 105 mm recoilless steel cartridge cases were the result of furnace brazing at Skagit Steel and Iron Works, Sedro Woolley, Washington. Use of a General Electric

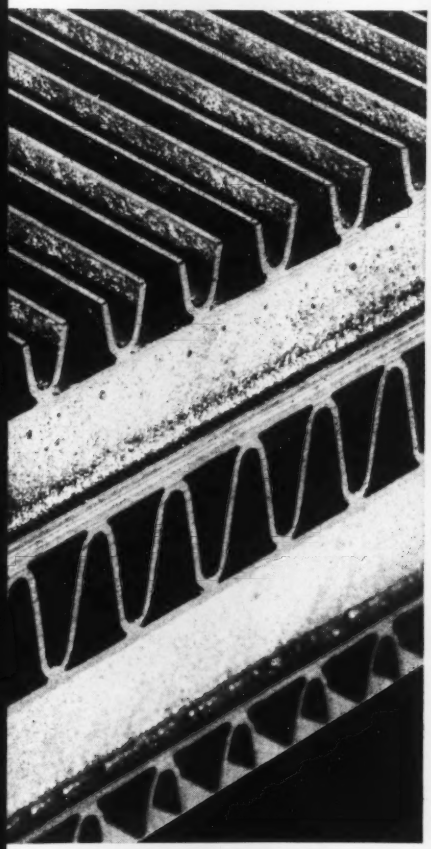
FURNACE BRAZING'S GOLDEN ANNIVERSARY

PIONEERED AND DEVELOPED BY G.E.

1907
A scientist in General Electric's laboratory found that, in hydrogen, molten copper wets iron and makes strong bonds.

1912
Tungsten contacts for automobile ignition systems were successfully joined to steel fingers by furnace brazing.

help Griscom-Russell solve on Plate-Fin heat exchanger



Uniform brazing achieved with new Gas-Fired Bell Furnace from General Electric

Here's a complex heat exchanger just developed by Griscom-Russell Company, Massillon, Ohio. It is constructed of mild steel, coated and furnace brazed with a nickel base alloy for high temperature gas-to-gas applications. These applications include gas turbine regenerators and furnace or kiln air preheaters for recovery of stack gas heat.

PROPER SELECTION: Because they needed high production capacity, rigid quality control and good operating economy, Griscom-Russell and General Electric's industrial heating specialists considered several different furnace setups to accomplish the braze. The solution was a gas-fired rectangular bell furnace consisting of the heating bell and four bases and retorts—for heating, holding, and cooling. This solution gives Griscom-Russell the needed effect of semi-continuous processing with the added advantage of individual heat control for each valuable load.

PLACING THE HEAT: To get uniform brazes throughout the work, both under- and over-firing were used. A special piping and baffling arrangement was designed to preheat and distribute the protective atmosphere gas, dissociated ammonia. Assuring temperature uniformity and conserving heat, the new furnace exhausts are at the bases rather than through a vent at the top of the furnace.

THEY LIKE IT: Demonstrating that the many problems were solved satisfactorily, Griscom-Russell says, "Using the General Electric gas-fired furnace, our assemblies can be uniformly brazed and completely coated with corrosion resistant alloy in just one operation".

THOROUGH PLANNING: Griscom-Russell's representative goes on to say "General Electric gave us a lot of helpful advice and excellent service from early in the planning stages of the process development right through the delivery and installation of the shop-assembled furnace in our plant".

HEAT PROCESS PROBLEMS: Just ask for the services of your local General Electric Apparatus Salesman. Or send us the coupon for literature.

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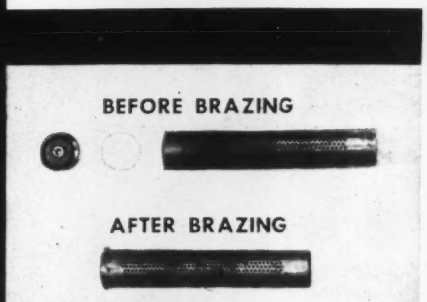

roller hearth brazing furnace eliminates costly press work, four or more process anneals, machining and perforating of the tube after it is formed. For more information send coupon at right.

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Schenectady 5, New York

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- ☐ Protective Atmospheres, GEA-5907

TECHNICAL BULLETINS

- ☐ How and Where to Use Furnace Brazing, GEA-3193
- ☐ Electric Furnace Brazing, GER-106
- ☐ Furnace Brazing of Machine Parts, GER-339
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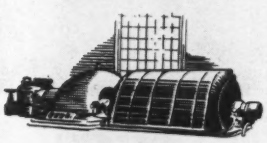

1919
Turbine-diaphragm nozzle rings were successfully copper brazed in production by G-E three-stage furnace.

1927
The General Electric "Monitor-top" refrigerator included several copper brazed sub assemblies.

1957
In defense, stainless steel assemblies for air frames, jet engines, guided missiles and nuclear equipment are now G-E furnace brazed to obtain high strength at high service temperatures, light weight and high quality.

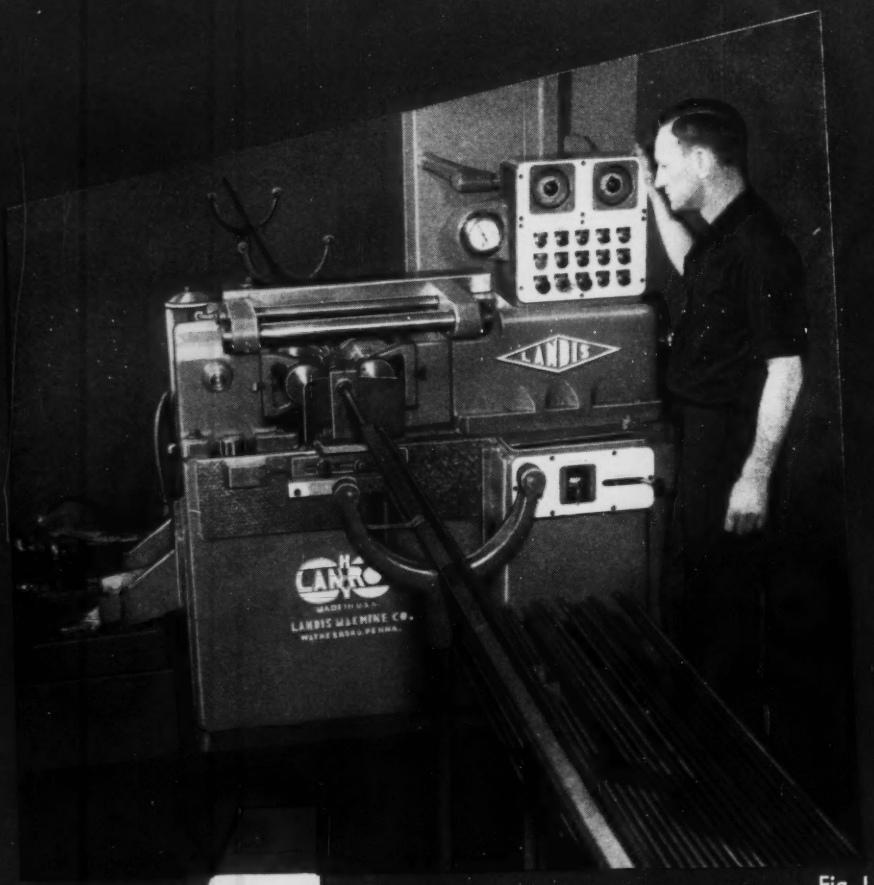

Fig. 1

4 feet of thread *per minute*

with the LANHYROL thread rolling machine

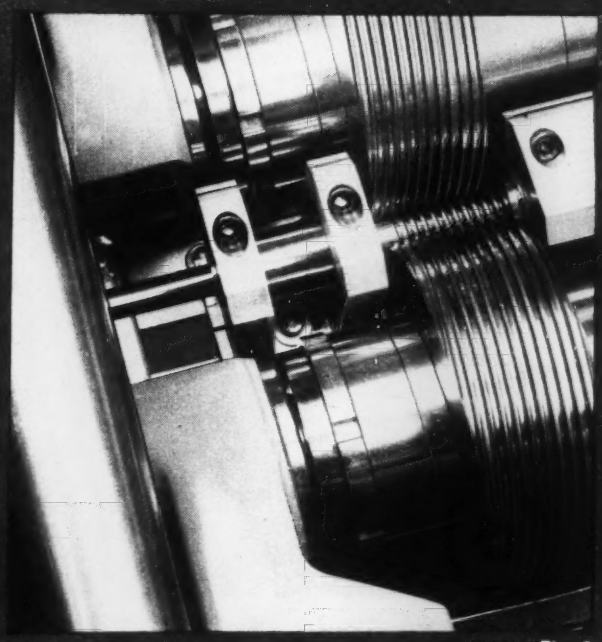

Fig. 2

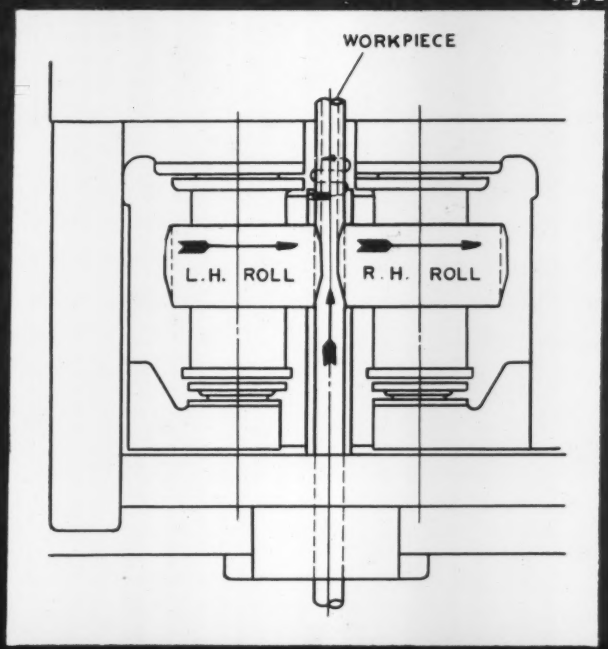

Fig. 3

The LANHYROL Thread Rolling Machine has shown outstanding results in output and thread quality producing ¾" jack screws at the M & S Manufacturing Company in Hudson, Michigan.

20-foot bar lengths of C1117 steel are being formed by Thrufeed Rolling at the rate of 48 linear inches per minute. The ¾"—6 pitch left-hand Acme threads are held within .001" on the pitch diameter throughout the entire bar length. Over 59,000 feet of thread have been produced with a set of roll dies.

Thrufeed Rolling is designed for workpieces requiring threads on the maximum diameter only or for headed parts with over 5⅞" of thread length. In this application, the workpiece is placed in a feeding tube which is halved for loading convenience (Figure 1). It is then passed axially into ball-bearing work supports and between the rolls (Figure 2). Rolls with a throat section for progressive generation of the thread provide a self-leading action as the threads are formed (Figure 3). Operation is continuous, with rolls revolving at correct fixed center distance. The right-hand roll unit may be retracted at anytime for set-up adjustment or stock removal.

The LANHYROL Machine also produces quality threads at high rates of output by the Infeed and Continuous rolling methods. Its range and flexibility is so great that we recommend your consideration of this equipment for any job requiring precision threads of excellent finish at high production rates. Please send specifications and ask for Bulletin E-60.

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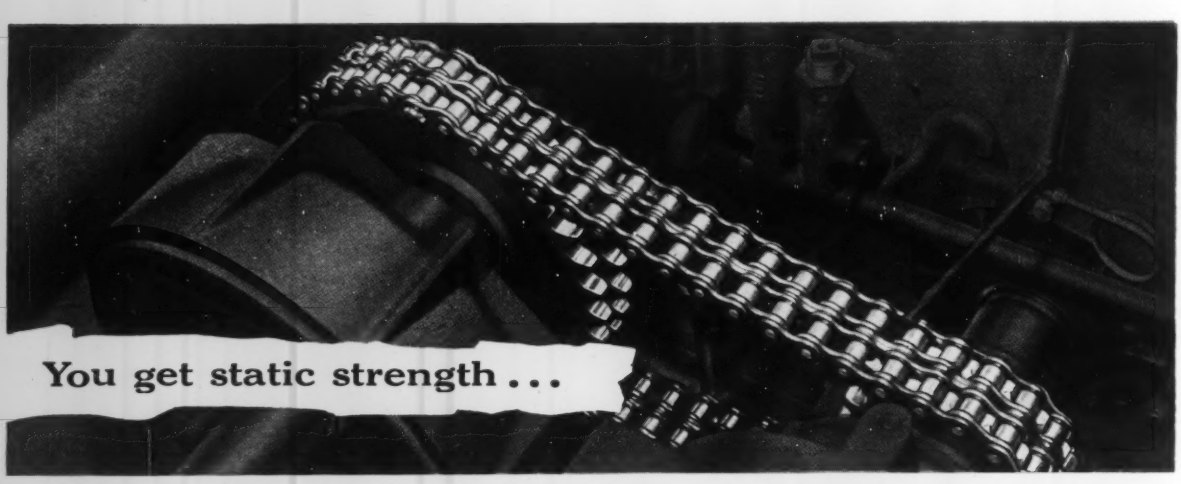

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CALENDAR
OF MEETINGS

Aug. 5-6, National Screw Machine Products Association: National sales conference, Moraine hotel, Highland Park, Ill. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive vice president: Orrin B. Werntz.

Aug. 12-15, Society of Automotive Engineers: West coast meeting, Olympic hotel, Seattle. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Aug. 20-23, Western Electronic Show & Convention: Cow Palace, San Francisco. Information: WESCON, 342 N. LaBrea, Los Angeles 36, Calif.

Aug. 28-30, American Institute of Electrical Engineers: Pacific general meeting, Chinook hotel, Yakima, Wash. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Sept. 8-11, National Metal Trades Association: Eastern plant management conference, Essex-Sussex hotel, Spring Lake, N.J. Association's address: 337 W. Madison St., Chicago 6, Ill. Secretary: Charles L. Blatchford.

Sept. 9-11, American Mining Congress: Metals mining and industrial minerals convention, Utah and Newhouse hotels, Salt Lake City, Utah. Congress' address: 1102 Ring Bldg., Washington 6, D.C. Executive vice president and secretary: Julian D. Conover.

Sept. 9-12, Society of Automotive Engineers: Tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N.Y. Secretary: John A. C. Warner.

Sept. 9-13, Instrument Society of America: Annual instrument - automation conference and exhibit, Public Auditorium, Cleveland. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 12-14, Automotive Parts Rebuilders Association: Annual meeting and exhibit, Congress hotel, Chicago. Association's address: 220 S. State St., Chicago 4, Ill. Executive secretary: Jack O'Sullivan.

Sept. 17-18, Radio-Electronics-Television Manufacturers Association: National technical machine tool automation meeting, Ambassador hotel, Los Angeles, Calif. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Secretary: James D. Secrest.

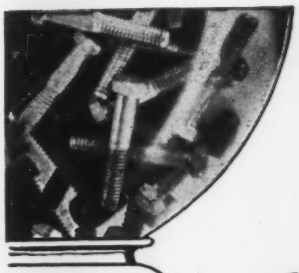
Sept. 17-20, American Die Casting Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N.Y. Secretary: David Laine.

Sept. 18-20, National Industrial Conference Board: Marketing meeting, Waldorf-Astoria hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Sept. 21-24, Steel Founders' Society of America: Fall meeting, Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, O. Secretary: George K. Dreher.

Sept. 22-24, American Machine Tool Distributors Association: Annual meeting, Hotel Cleveland, Cleveland. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelly.

Sept. 22-25, American Institute of Wholesale Plumbing & Heating Supply Association Inc.: Annual meeting, Waldorf-Astoria hotel, New York. Institute's address: 402 Albee Bldg., Washington 5, D. C. Executive secretary: George T. Underwood.



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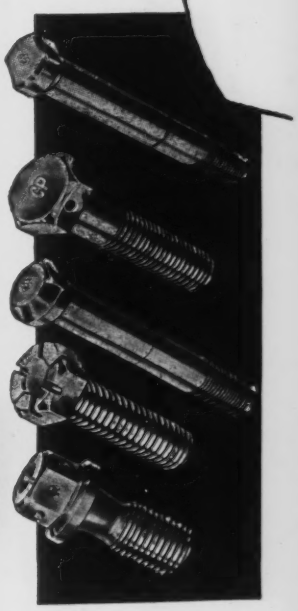

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Left to right: light-duty angle screw driver; light-duty angle nut setter; heavy-duty angle screw driver; heavy-duty angle nut setter.

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Gardner-Denver Company, Quincy, Illinois

July, 1957 Vol. 4 No. 2

NATIONAL CARBON COMPANY'S

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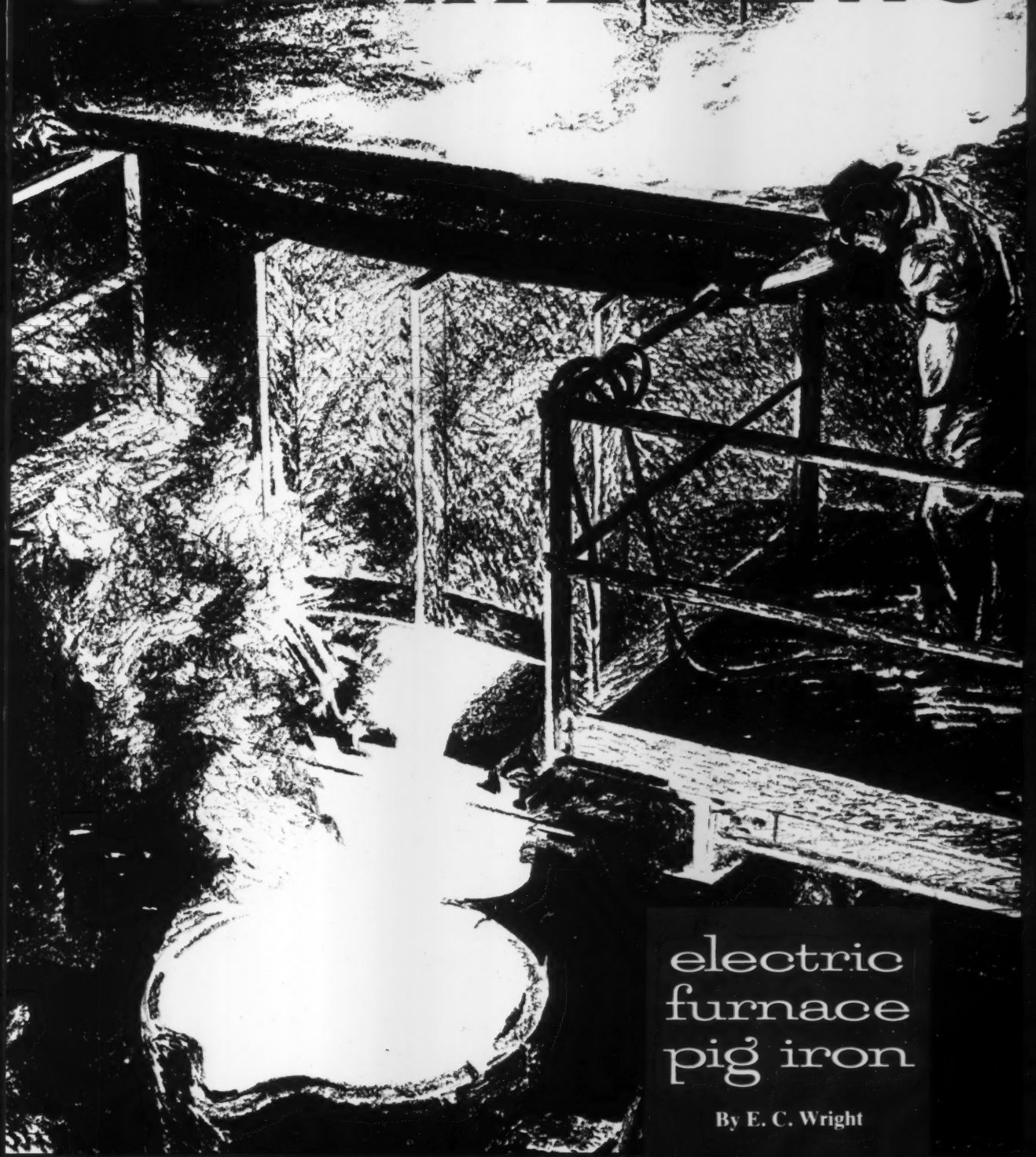
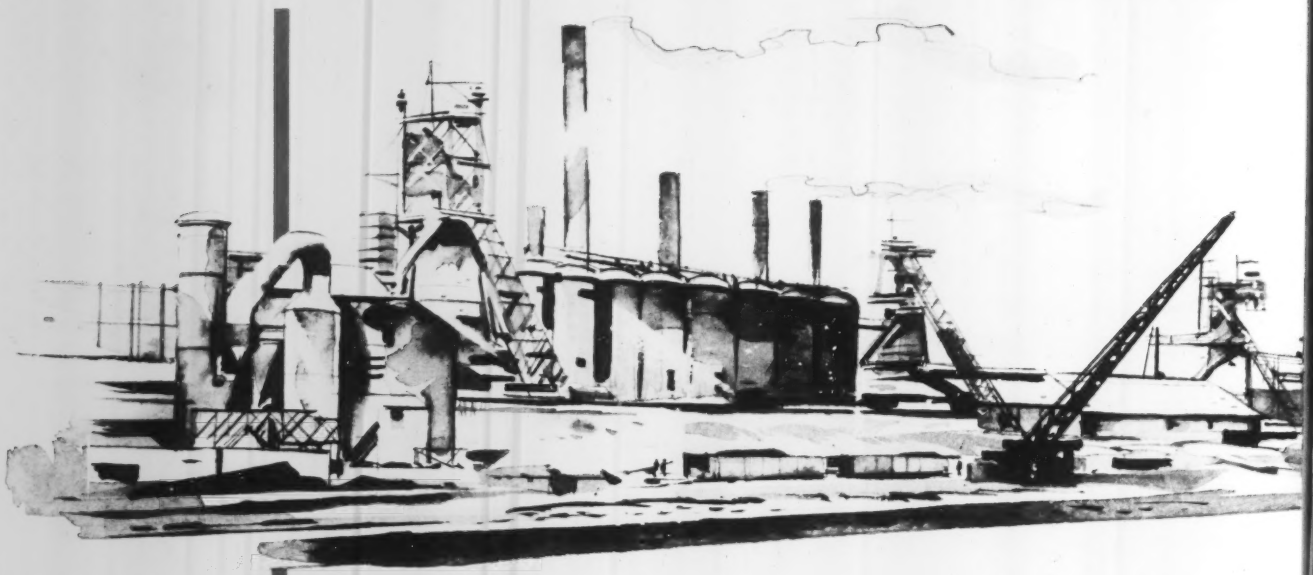


electric furnace pig iron

By E. C. Wright



Current Technical and Economical Factors Affecting the Steelmaking Process

- Great increases in freight rates which affect the cost of assembling raw materials.
- Large increases in cost of mining coal and ore.
- High cost of steel scrap.
- Use of cheap oxygen for desiliconizing hot metal for open hearth or electric furnaces.
- Large increases in the use of high grade (over 60% Fe) imported iron ores.
- Use of concentrated magnetite ores which are upgraded to over 60% Fe.
- Complete pre-preparation of blast furnace charge involving accurate sizing of coke, stone, and ore particles including sintered or pelletized iron ore concentrates and complete elimination of all fines from the charge.
- Use of pre-reduced iron ore for electric furnace pig iron smelting at significantly lower power inputs than prevail abroad.

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electric furnace pig iron

By E. C. Wright

Head, Department of Metallurgical Engineering University of Alabama University, Alabama

Many new technical and economic factors have developed in the past five years which may have an important bearing upon determining the best process to use for making steel at various locations in the United States. Some of the most important of these are cost factors—items such as substantial freight rate increases affecting the cost of assembling raw materials, high cost for steel scrap, sizeable increases in mining costs for coal and ore and the use of cheap oxygen in desiliconizing hot metal for open hearth or electric furnaces. Other important factors are technological in nature. Typical items in this category involve the use of concentrated magnetic ores upgraded to over 60% Fe, large increases in use of high grade (over 60% Fe) imported iron ores, and the use of pre-reduced iron ore for electric furnace pig iron smelting at significantly lower power inputs than prevail abroad. Also, the complete pre-preparation of blast furnace charge involving accurate sizing of coke, stone, and ore particles including sintered or pelletized iron ore concentrates and complete elimination of all fines from the charge.

Two Important Results

At the present time the impact of these developments seems to indicate two important results:

(1) The increased use of higher grade ores or concentrates and fully prepared uniform blast furnace burden will obviously increase blast furnace output per day, decrease coke rate, flux requirements, slag volume, capital charges and overhead on the cost of producing hot metal. These factors will decrease the cost of hot metal based on present costs of raw materials and will greatly benefit fully integrated plants which have ample blast furnace capacity. If these conditions prevail, the future expansion of steel output will be based on increases in blast furnace capacity and greater use of hot metal as compared to cold scrap. Technical improvements indicate such a conclusion but the economics of the relative cost of steel scrap and iron ore will determine the outcome at any given period. Decreasing melt time by means of faster charging, higher blast furnace hot metal charges, desiliconizing blast furnace hot metal or blowing the bath with oxygen at integrated plants will reduce the cost above material as most of the items included in these costs represent an hourly cost which is inversely proportional to the rate of production. The fully integrated plant will thus benefit by new practices in both the blast furnace and open hearth or electric furnace stages and this will increase the favorable cost differential over the cold metal melt shops as long as steel scrap remains over $40 per net ton.

(2) Steel production from cold steel scrap melts at non-integrated open hearth or electric furnace plants

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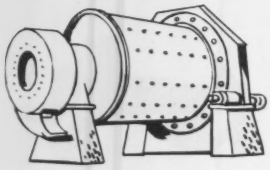
Five Basic Steps of Direct Reduction by Electrics



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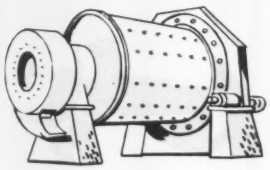

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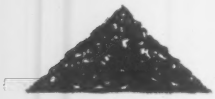

ORE

COAL

will be more costly than charges containing over 40% hot metal whenever the price of scrap is over $40 per net ton. The 1956 Directory of the Iron & Steel Institute showed about 73 electric furnaces of 30 to 150 ton capacity at non-integrated plants where no hot metal is available. At the Electric Steel Conference at Chicago in December, 1956, there was much discussion of the high cost scrap problem among non-integrated electric steel producers and four papers were presented which described the substitution of other iron bearing materials for cold steel scrap. At that time, the Iron Age composite price was $59 per net ton. Some of the papers discussed the direct reduction of high grade iron ores by the electric furnace method, hydrogen reduced iron (H-iron), Swedish sponge iron, additions of ordinary hot metal, and/or the use of desiliconized hot metal as substitutes for all or part of the steel scrap in the charge. Electric furnace direct reduction is an economical method of supplementing blast furnace hot metal at integrated plants, and is also an economical method for making hot metal available to present non-integrated plants.

Direct Reduction By Electrics

The introduction of pelletizing for the processing of fine ores and concentrates has led to some odd new developments. Mineral pellets are made by rolling finely divided minerals with accurate amounts of water in balling drums or rotating discs. Balls or pellets of various sizes are produced in a very wet state and these must be dried and then fired to a high temperature to heat harden the pellets. Usually fine coal (1–2%) is incorporated in the pellet to supply the necessary fuel for the heat hardening process. This yields a strong pellet in the highly oxidized state. Several engineers have found that additions of coal approaching 25% of the pellet weight will not only develop a hard, strong pellet, but also pre-reduce much of the Fe_2O_3 or Fe_3O_4 in the pellet to FeO or metallic iron. Furthermore, hot pre-reduced pellets (above 1600°F) may be discharged directly into a submerged arc electric smelting furnace and produce hot metal directly from the pre-reduced pellets with a great saving in electric power.

Calculations indicate that a 32 ft. diameter furnace, 45 inch pre-baked carbon electrodes, and 20,000 KVA available power will produce 400 tons of hot metal per day at a cost of $45 or less per net ton. Very low sulphur pig iron is made in a basic lined furnace. The equipment needed for such an installation is mainly:

1. Grinding and Blending machinery for mixing the ore, coal and limestone.
2. Pelletizing Equipment.
3. Sintering machine or vertical shaft furnace for the heat hardening and pre-reduction of pellets.
4. Submerged arc smelting furnace for making hot metal.

Economic Advantages

The direct reduction of high grade iron in submerged arc smelting furnaces is widely practiced in several foreign countries where the cost of coal and coke is high. Foreign plant operations consume about 2270 KW hours per net ton. Developments in the United States make it possible to produce electric pig iron at roughly ½ the KWH per ton consumption of foreign plants.

Estimates indicate an investment in the neighborhood of $6,000,000 should cover the installation of a 400 to 500 ton per day unit. Based on 8000 hours per year operating time the investment cost will approximate $40 per annual pig iron ton which is somewhat less than that of a complete blast furnace, coke plant and accessories. It is obvious that as long as steel scrap remains above $45.00 per net ton, the substitution of molten hot metal at $45.00 per ton or less would be an asset to a cold scrap electric furnace plant for either carbon steel or alloy steel heats. The use of high grade foreign ores or concentrates containing over 60% Fe would also lower the cost of this operation by decreasing slag volume, fluxes and power required on the electric furnace. This new process thus suggests a way out of the present economic difficulty which has arisen to plague all cold scrap melting operations as a result of widely fluctuating scrap prices; it also enables a small non-integrated melt shop or foundry to obtain 400 tons per day of molten hot metal without facing the very high investment cost encountered in the construction of a modern blast furnace plant.

Another advantage of this hot metal supply is that it could be cheaply desiliconized with oxygen and

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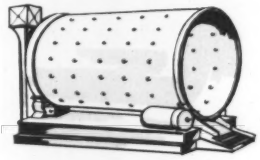
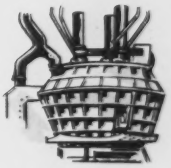


PELLETIZING

PELLETS

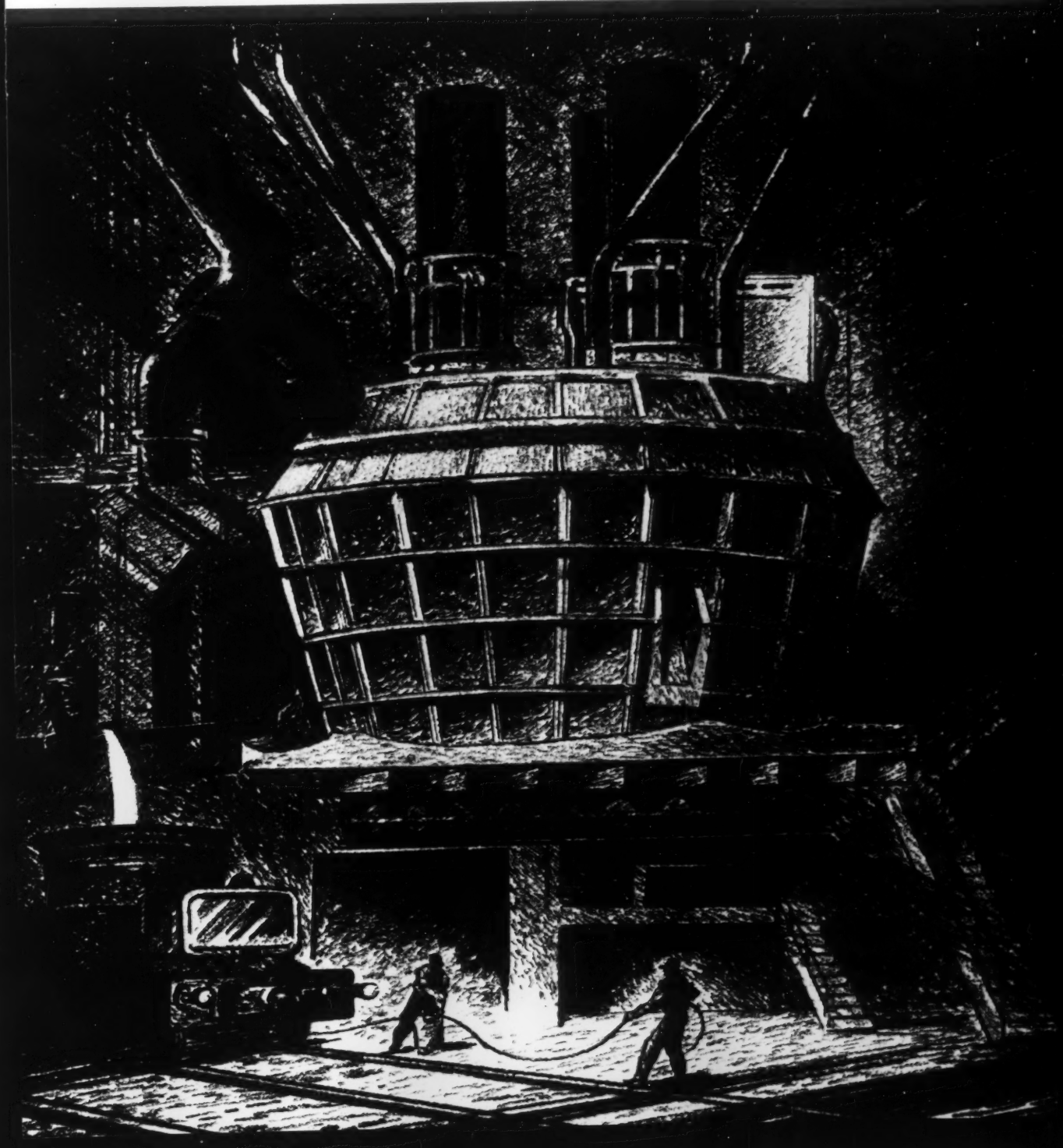
REDUCTION

REDUCED ORE PELLETS



ELECTRIC FURNACE SMELTING

HOT METAL OR PIGS



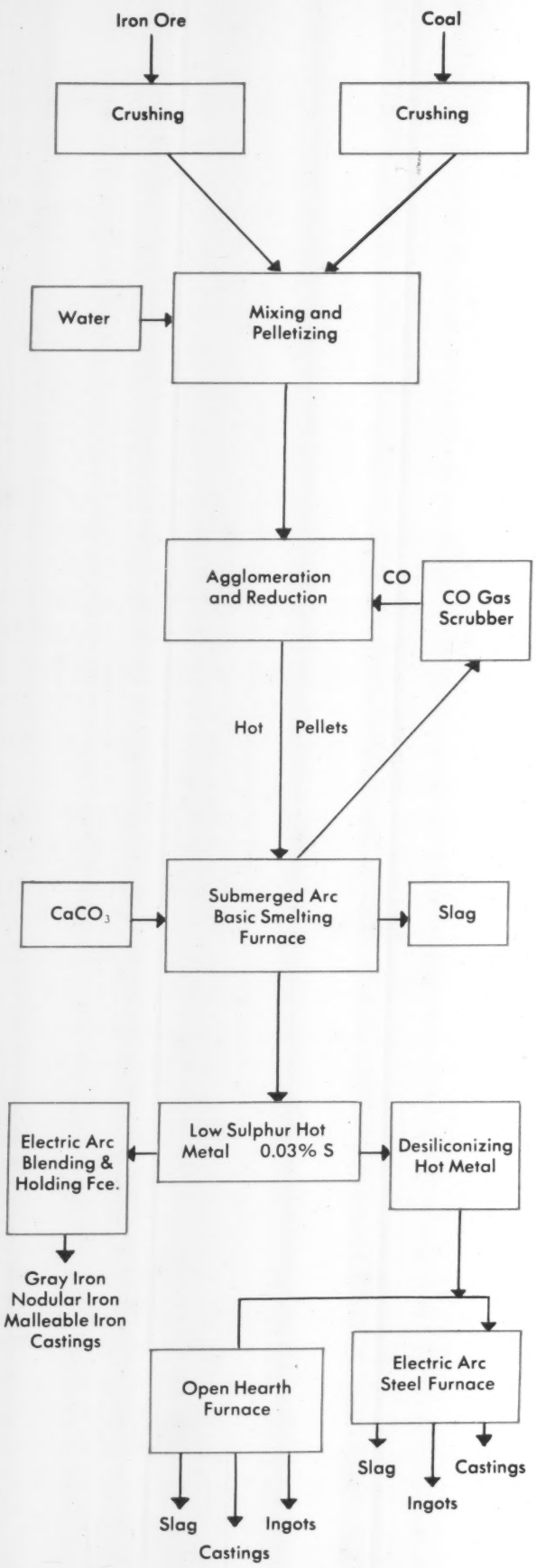
thus make possible production rates in electric steel furnaces of over 40 tons per hour in a 100 ton furnace instead of 20-25 tons per hour now made on cold scrap charges. This would reduce the cost of steel melting by saving power, electrodes, labor, etc. In addition, electric furnace pig iron can be produced and controlled within very close limits of carbon, silicon and sulphur, which should help to reduce processing costs where these elements must be controlled by present day operations. This over-all per ton saving might well be credited to the amortization of the hot metal producing unit.

The installation of an electric arc smelting plant using a pre-reduced iron ore charge should also be of great value to large iron and steel foundries which consume over 100 tons of cold pig iron per day. Such equipment could produce molten iron of low sulphur content economically, depending on the cost of iron ore at the plant. A large foundry today must pay $60 per net ton for cold pig iron, plus freight and handling charges ($5—$12 per ton), plus about $5 for melting. Therefore, molten iron ready for casting thus costs between $70—$75 per net ton. Hence an electric furnace pig iron installation would seem to be very attractive in many large foundries in view of the low cost of $45.00 per ton or less. The low sulphur iron made in this basic furnace is also of great advantage for iron castings, particularly the new ductile cast iron.

An additional advantage of electric pig iron plants lies in the fact that they can be fairly small or relatively large . . . for example, the extreme versatility of this type of installation permits production of 200 to 400 tons per day from a single unit, and naturally much greater outputs from multi-units. As a matter of fact, a large multi-unit electric furnace plant can be built at a lower capital investment than a multi-unit blast furnace plant of similar capacity. Furthermore, such a multi-unit electric furnace plant will show operating costs comparable to a modern blast furnace plant.

Hydrogen Reduced Iron

Lately there has been considerable discussion of hydrogen reduced iron ore as a substitute for costly steel scrap. At the present time this operation is based on a fluo-solids reduction roast at various temperatures and pressures. Three pilot plants are using different methods of producing the iron; one operation uses pure hydrogen at 400 pounds pressure and conducts the reduction at about 900°F; the second method accomplishes the reduction at about 1300°F and 50 pounds pressure, also using pure hydrogen; and the third method is being studied at atmospheric pressure and the reduction is done at about 1600°F using a reducing gas consisting of carbon monoxide and hydrogen. In all of these schemes the finally



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divided ore mineral is exposed to the reducing gas under the conditions listed with the aim of producing a high grade iron powder. The resulting powder is quite pyro-phoric and must be stored in steel containers until cold and then agglomerated or compacted in some manner which will enable it to be handled in melting. Little economic information is available on these tentative processes but one author has estimated that such material may be produced at a cost of $45–$50 per ton with natural gas as a source of hydrogen when the cost of the gas is less than $0.50 per thousand cu. ft.

Sponge Iron

The Scandinavian steel producers have long used sponge iron as a source to substitute for steel scrap and some of the steel plants are producing steel wherein the sponge iron represents 50%–80% of the total metallic charge. It is reported that 130 thousand tons of this material per year are used for steel making in Sweden. Sponge iron is produced in crucibles, in tunnel kilns, and also in Wilberg-Sodarfers vertical furnaces at a cost estimated at $45–$55 per ton. The total iron content of such materials as H-iron and sponge iron is usually 90%–95%. When the cost of steel scrap exceeds $50 a ton these materials which are charged cold into steel melting furnaces would be competitive with steel scrap.

The use of ordinary hot metal in electric arc furnaces has appealed to the electric furnace steel smelters for many years, but it has only occasionally been employed even in integrated steel plants because of the short supply of hot metal for the electric furnace. When hot metal is available in integrated steel plants, it has always been used in the open hearth rather than the electric furnace. Since normal hot metal contains about 4% carbon and 1%–1½% silicon, and since the electric furnace has a reducing atmosphere, much larger charges of iron ore are necessary to oxidize the impurities in hot metal charges. This gives rise to several difficulties such as large slag volume and a tremendous evolution of Co gas from the furnace, and it is probably for these reasons the use of normal hot metal is not employed in the arc furnace. The use of desiliconized hot metal overcomes these difficulties by reducing iron ore lime charges, slag volume, and greatly increasing melting time. If more hot metal could be made available, then it would naturally be used after desiliconizing in electric furnaces at great savings in cost.

Desiliconizing

Work during the past two years has clearly demonstrated that the use of ordinary hot metal can be affected by either blowing oxygen into the bath in the electric steelmaking furnace or treating the hot metal

Look Ahead—
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Gives greatest flexibility—
Makes any steel – any time – from stainless to plain carbon. Handles cold scrap, metallics, hot metal. Starts, stops quickly –gives faster melts.

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Closer temperature control possible.

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40% less than equivalent open-hearth capacity.

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Goes up fast—
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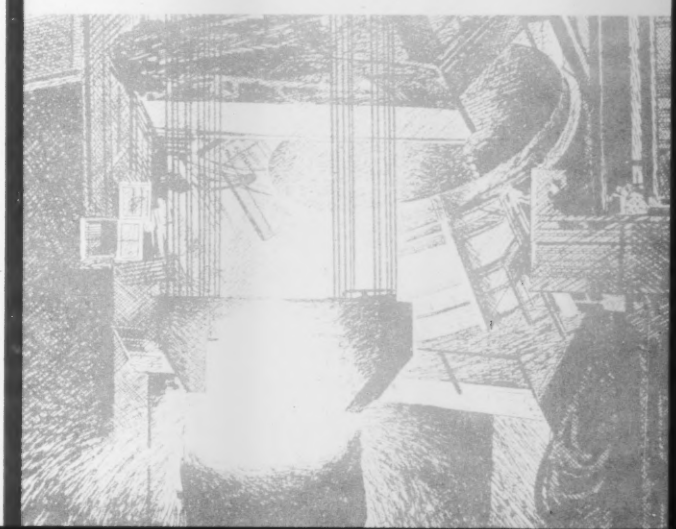
No combustion products to contaminate melt.



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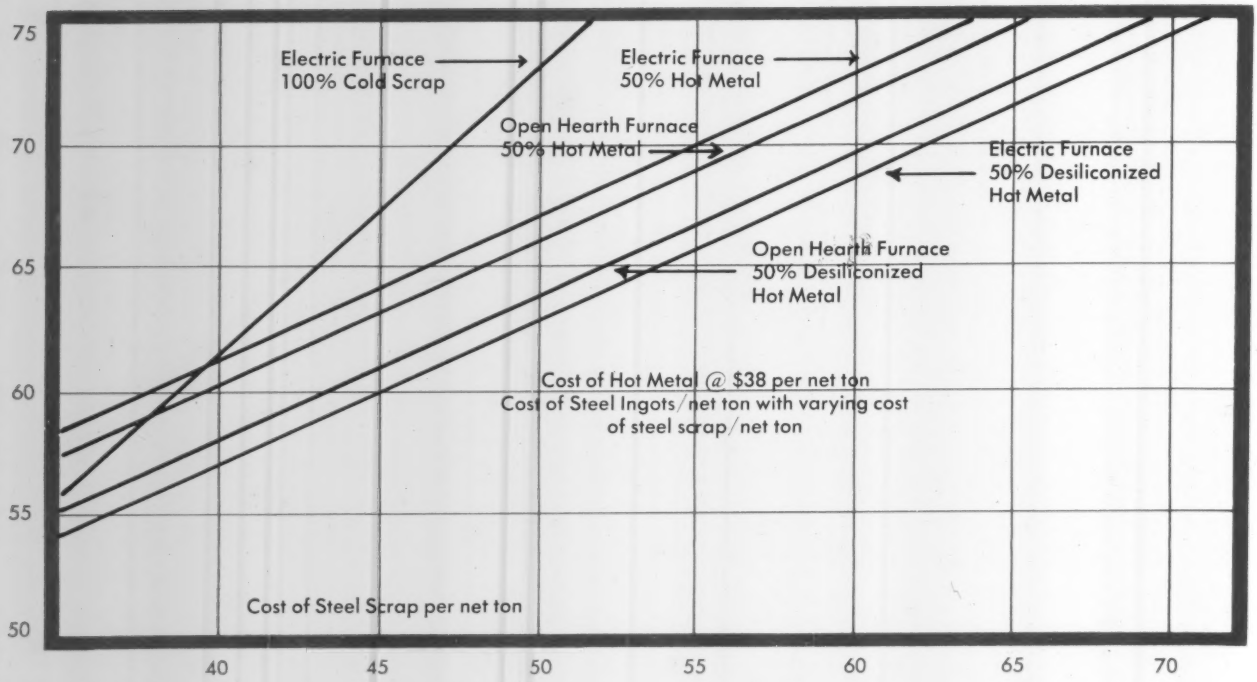

COST OF PRODUCING STEEL INGOTS BY VARIOUS METHODS

with oxygen prior to charging into such a furnace. This operation is termed desiliconizing. The elimination of three-fourths of the carbon in hot metal and all of the silicon so greatly speeds up melting operations in the electric furnace that output is doubled, as the desiliconized hot metal represents a charge of molten steel scrap at a high temperature of about 3000°F. By use of such additions, the output of an electric arc furnace can be doubled by charges of 50%–60% desiliconized hot metal at a cost lower than the cost of melting a 100% cold scrap charge. Some furnaces in Germany are already operating with this practice, usually by blowing oxygen into the arc furnace, but good results have also been obtained on experimental heats where the desiliconizing has been accomplished prior to the charging.

Hot Metal Assures Flexibility

Based on the economic discussions in this article, the influence of widely varying cost of steel scrap on the cost of producing steel ingots by various methods has been calculated and is shown in chart above, which brings out the result. This comparison shows the relation of 100% cold scrap, 50% hot metal, and 50% desiliconized hot metal charges in both open hearth and electric furnaces. In this chart the cost of pig iron is taken at $38 per net ton.

It is thus obvious that an electric steel melting plant which has a source of molten hot metal at $38 –$45 will assure a highly flexible situation which could be varied in relation to the widely different prices for cold scrap occurring from year to year.

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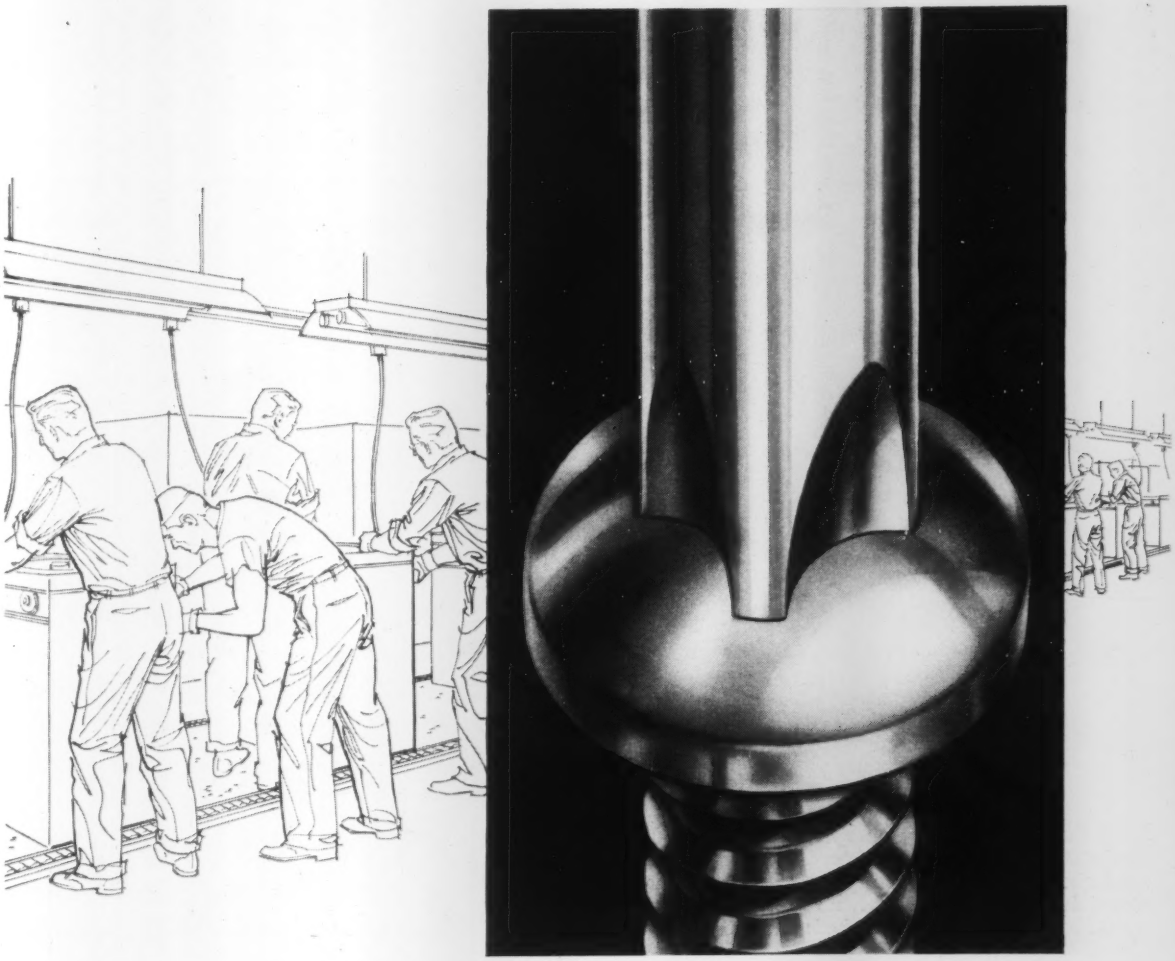

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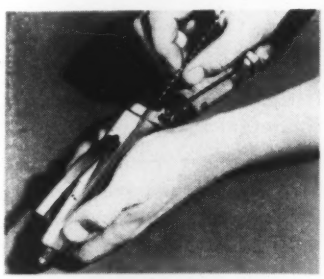

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Today, the makers of America's better cars are more than just critical when they specify steel for making bumpers. They realize that the broad and complex chromed areas front and back on their models must enhance the appearance of the cars if they expect to beat competition in today's tight market. They demand the best, and then test exhaustively against strict specifications to make sure they get it.

That's where Pittsburgh Steel Company shines. With its outstanding new cold rolling facilities backed up with the latest technology, it daily produces sheet for a variety of the toughest applications. When an automaker says of its bumper stock that yield must be held to 30-33,000 psi, and elongation must be 38% before failure—that's duck soup for Pittsburgh Steel. Orders like this come from one company that prides itself on less than one-half of one percent of scrap due to metal failure in the last half-million bumpers!

One bumper plant inspector put it this way: "We have to be especially careful to watch steel quality because, although the draw isn't unusually deep on wrap-around bumpers, it is very critical since it involves complex bends up to 120°. And even the tiniest stretcher-strain marks or other defects would show up like a sore thumb under the bright chrome finish."

If Pittsburgh Steel's sheets can meet standards as high as these, they can help you solve your forming problems, no matter how tough they may be. When you buy from Pittsburgh Steel you can always be sure you are getting sheet that has:

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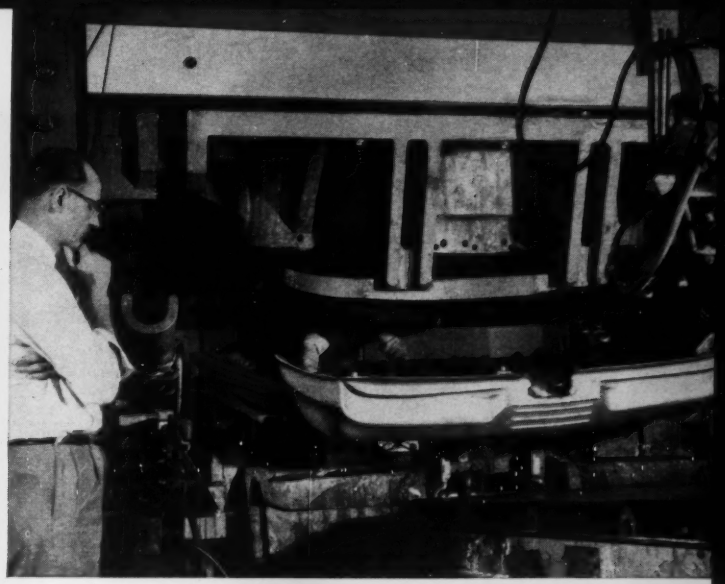
Grinding provides a surface finish which must not deviate more than 10 micro inches and since rarely more than 2% is taken off, the original sheet surface had to be excellent.



The draw of this massive press is critical since complex angles up to 120° must be achieved without steel failure. Sheet steel supplied by Pittsburgh Steel Company has excellent formability which stems from good internal quality.

After all drawing and stamping operations are complete, each bumper is carefully inspected before going to the plating line.

Each bumper gets a last close look after plating. The bright finish magnifies any defects so the surface must be perfect.

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- **Good Surface**—clean, bright and smooth—free from scratches, pits and slivers.
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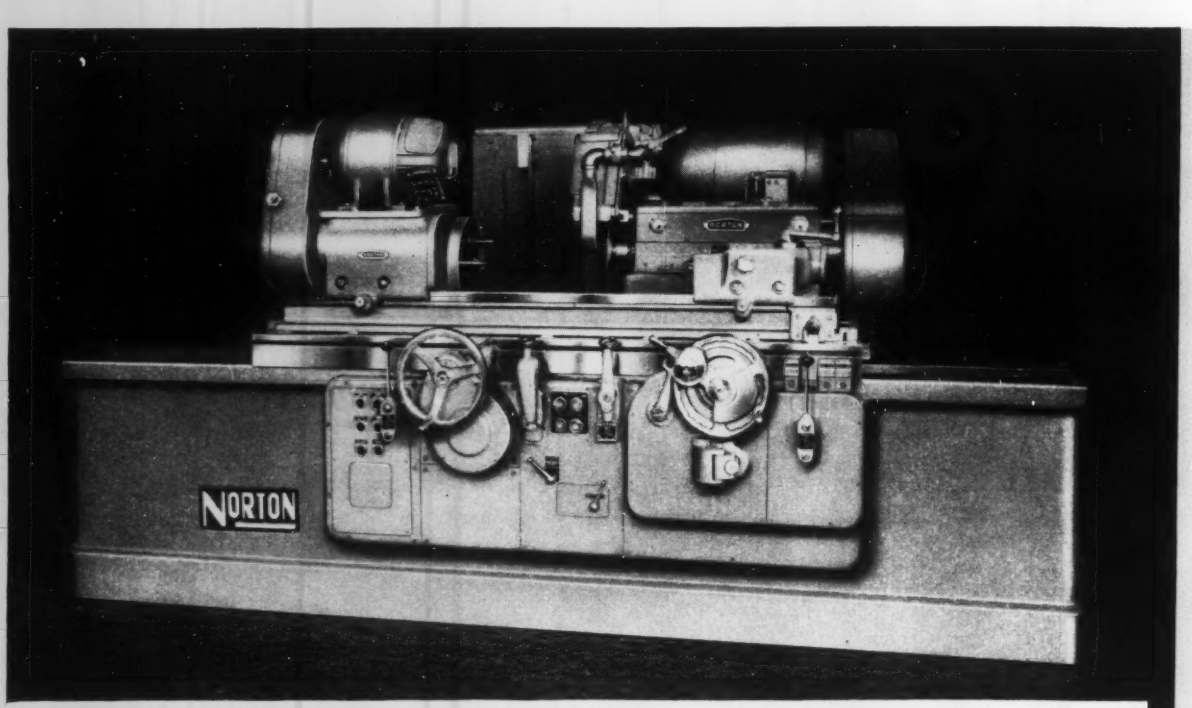

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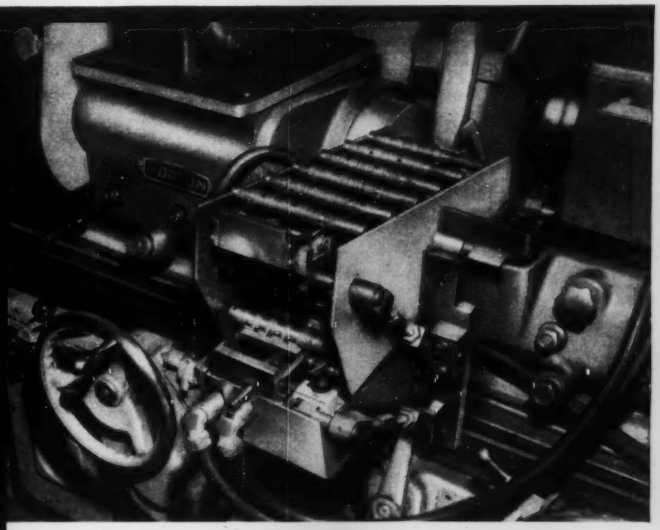
Production line and job shop users report that Norton 6″ and 10″ Type CTU cylindrical grinders have doubled and tripled production, replaced several machines and eliminated costly extra operations.

That's because of the many time-and-work-saving "Touch of Gold" features — standard and auxiliary — available with these grinders.

Some of the expertly automated auxiliary features are described here. Check them carefully — and figure their value to your own cylindrical grinding operations. And remember: only Norton offers you such long experience in both grinding machines and wheels to bring you the "Touch of Gold" that helps you produce more at lower cost. For further facts, see your Norton Representative, or write to NORTON COMPANY, Machine Division, Worcester 6, Mass. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

THE SWIVALIGN* ELIMINATES CUT-AND-TRY. Another Norton "Touch of Gold" development for faster, better, lower cost grinding. The SWIVALIGN Dual Electric Indicator, available for Norton cylindrical and universal grinders, enables operators to adjust the angular positions of swivel tables quickly and accurately, eliminating the usual cut-and-try guesswork. Featuring positive response and easy operation, this accurate instrument saves grinding time and money.



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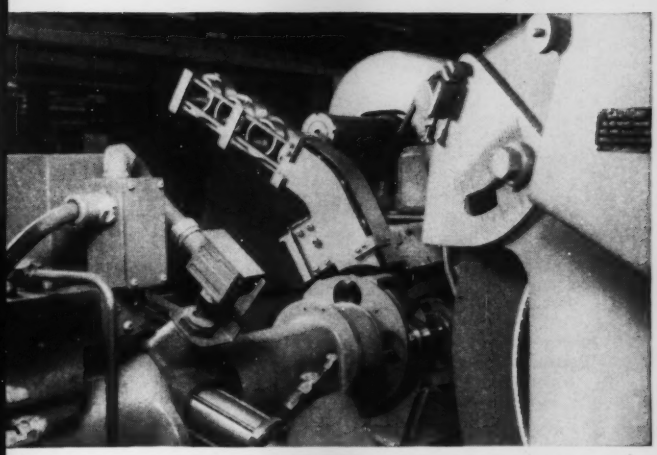

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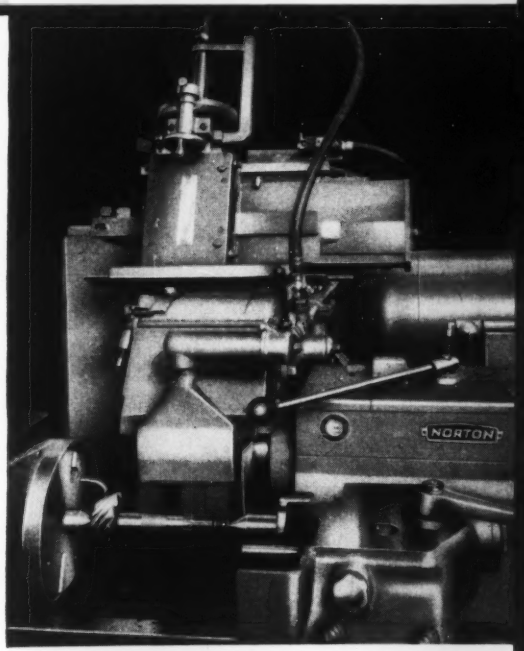
YOUR CHOICE OF AUTOMATIC LOADING DEVICES. Two types of Norton automatic loading devices are obtainable with 6" and 10" Type CTU semiautomatic grinders. The rail type loader is designed to handle a variety of small shafts. The turret type loader handles workpieces which must be chucked. Thanks to their steadily paced, automatic operation these Norton-developed loading mechanisms can be adapted to full automation. Or, they make it possible for one operator to tend a battery of machines, speeding production and cutting unit costs day after day.



WHEEL HEAD MOUNTED AUTOMATIC TRUING OFFERS BIG ADVANTAGES. A Norton automatic truing device, as shown here on a Type CTU grinder, quickly repays its original cost. It speeds up production, increases wheel life and increases diamond life. Also, it decreases the skill and effort required with hand truing. Operation is extremely simple. Once the original settings are made, all you do is push a button. Then the diamond automatically makes its round trip across the wheel face, at pre-determined speed and feed. Easy adjustments assure correct settings for each job . . . Another step forward in automatic grinding!

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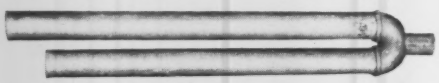

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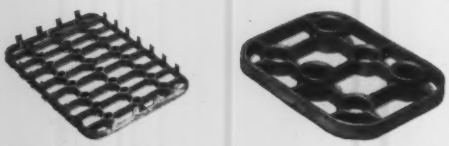

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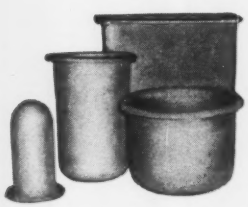

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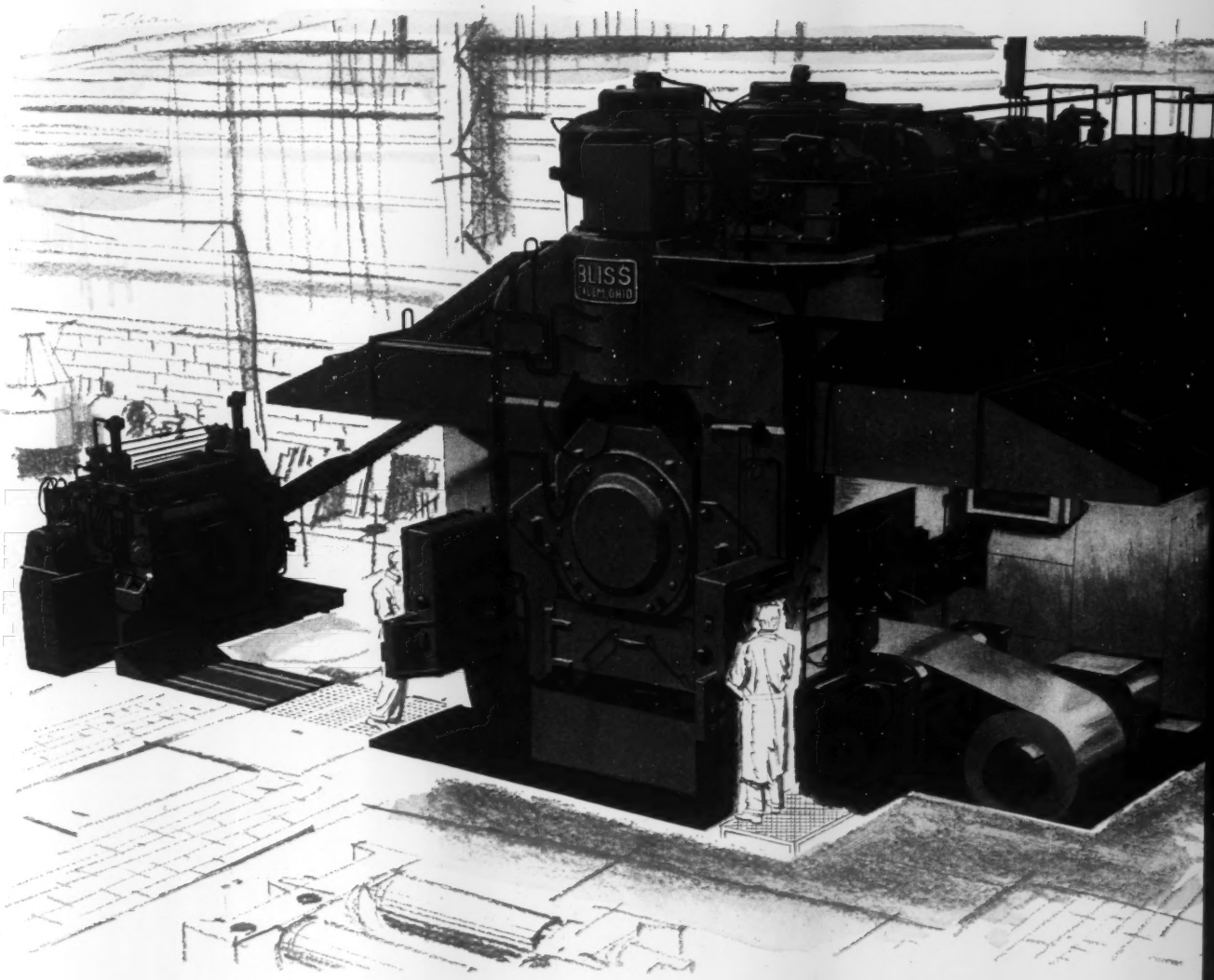

Belgian plant comes back to Bliss for another mill

The Phenix Works, Societe Anonyme, of Flemalle-Haute, Belgium, has just installed its second Bliss mill, a big four-high reversing type that will greatly increase the plant's output of cold rolled sheet products.

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Phenix Works put in its first Bliss mill seven years ago. The second installation is the logical outcome of the company's experience with Bliss equipment and engineering... additional evidence that "The Free World rolls on Bliss mills."

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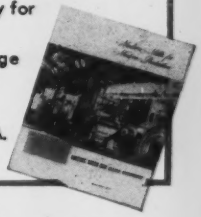

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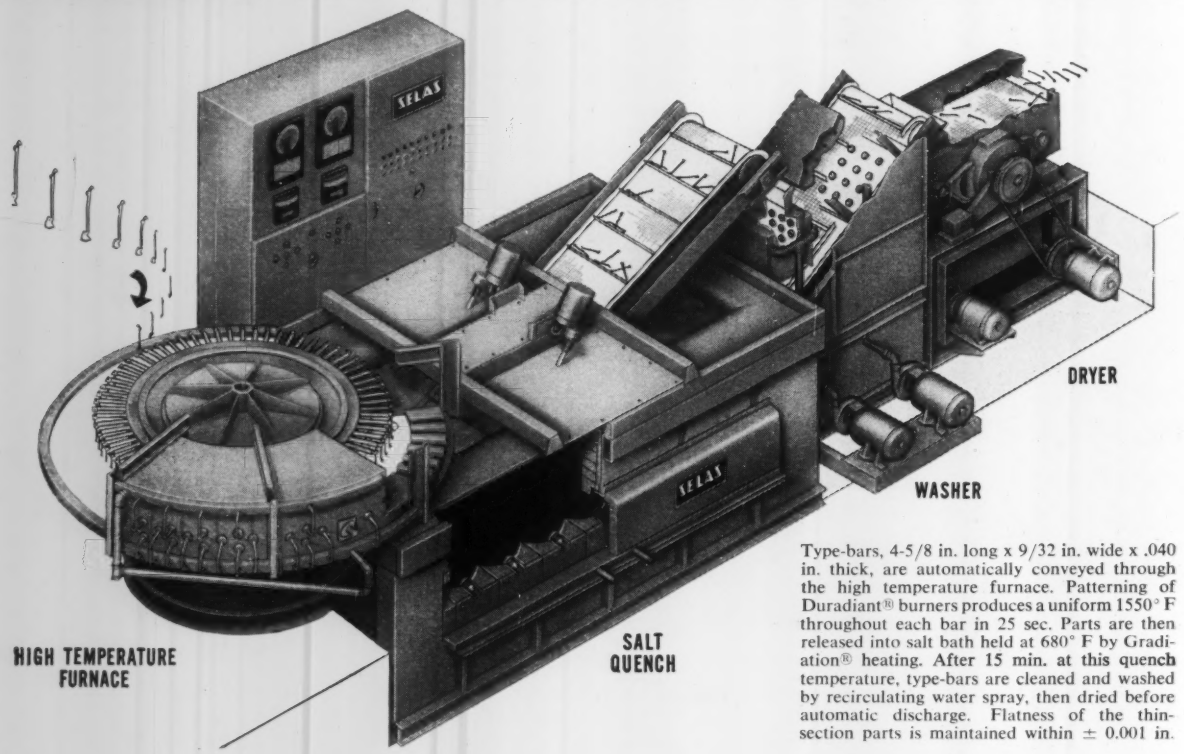

Type-bars, 4-5/8 in. long x 9/32 in. wide x .040 in. thick, are automatically conveyed through the high temperature furnace. Patterning of Duradiant® burners produces a uniform 1550° F throughout each bar in 25 sec. Parts are then released into salt bath held at 680° F by Gradiation® heating. After 15 min. at this quench temperature, type-bars are cleaned and washed by recirculating water spray, then dried before automatic discharge. Flatness of the thin-section parts is maintained within ± 0.001 in.

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Three men do the work previously performed by five with this integrated Selas heat-processing equipment. When automatic loading, for which the unit was designed, is added, the full production capacity of 5,000 type-bars per hour will be attained and further labor savings effected.

IBM electric typewriters require hard, tough, extremely flat type-bars for dependable performance. These characteristics are produced by heating the steel above the critical temperature, quenching at elevated temperature to permit isothermal transformation to occur. This process—austempering—is not new . . . the coordinated, multi-stage Gradiation heat-treating unit *is* new, offering a fresh approach to complex heat processing.

Cut-away view delineates continuous process cooperatively developed by IBM and Selas engineers. Actual unit, compactly fitted into minimum floor area, was completely built at Selas . . . including panel-mounted combustion and temperature controls.

For nearly a year the unit has been austempering steel type-bars at high production rates, at IBM's Kingston, New York, plant, with virtual elimination of rejects. So satisfactory has been the performance that a similar unit, for heat-treating other IBM electric typewriter parts, has been ordered and is now under construction at Selas.

To learn how Selas can help solve your particular heat processing problem also, write Department 28.

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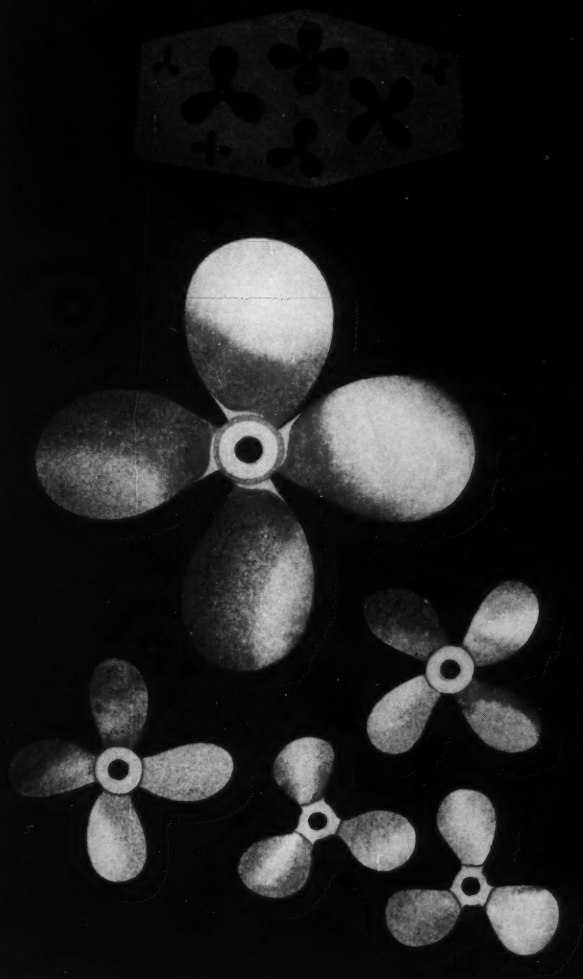

Not so very many years ago stainless steel propellers were experimental in nature. Many thought that they would be too high priced to ever compete with traditional propeller alloys. But we believed in the potential of steel. Our pattern, casting and machining facilities went into production—we manufactured some of the first stainless steel wheels. Today no doubt remains—stainless steel has proved itself far superior as a propeller alloy, and it can and is competitively priced. We are now manufacturing some of the largest stainless steel blades in the nation, and are prepared to design to your own specifications.

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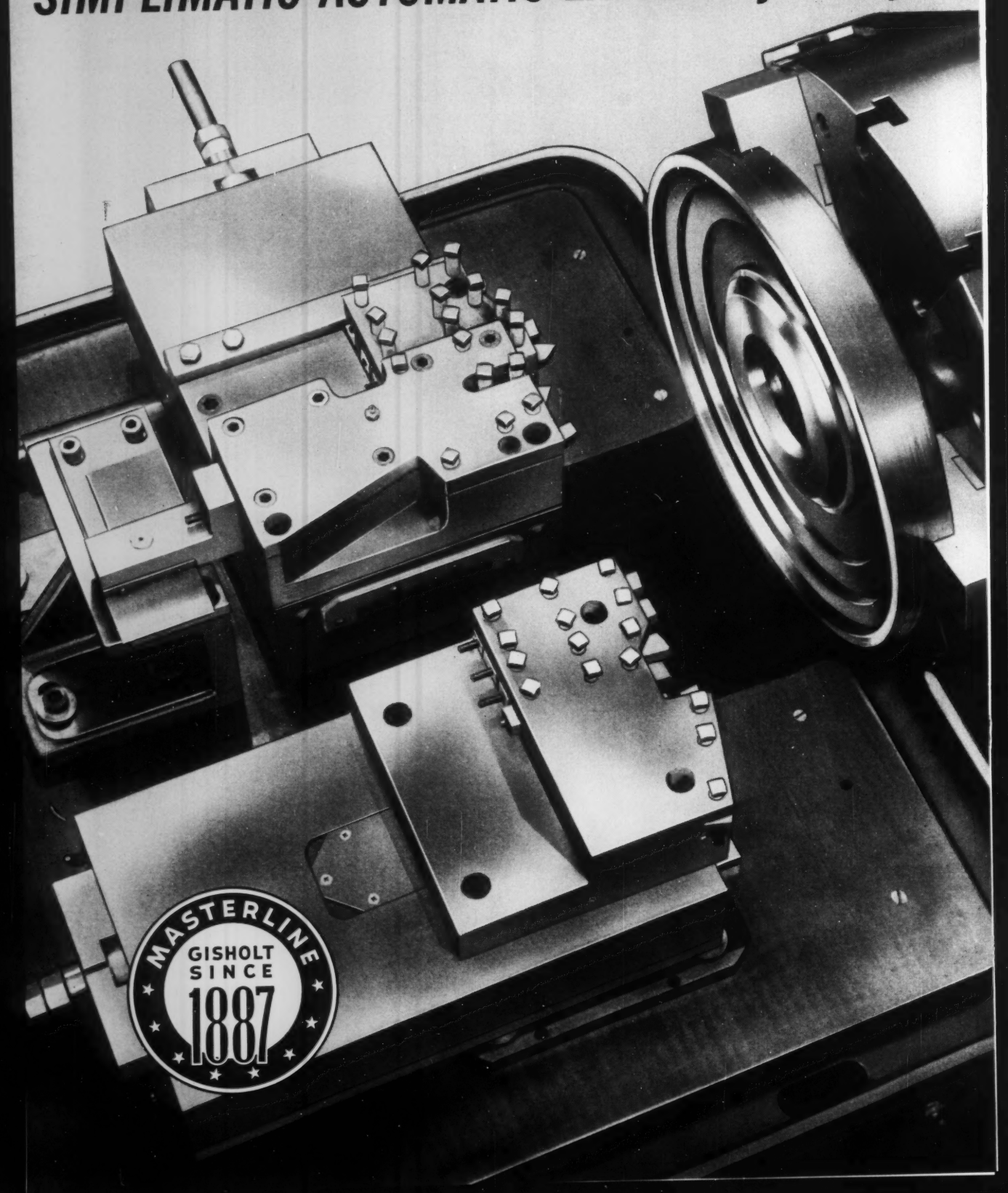
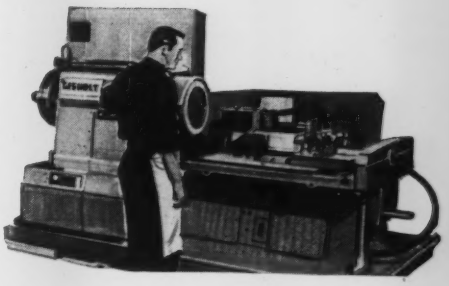
SIMPLIMATIC AUTOMATIC LATHE may save you



the cost of a special machine



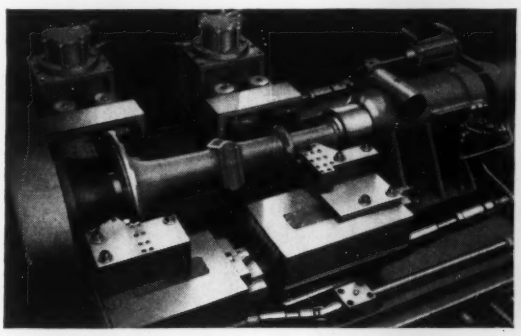
HERE'S WHY: the machine itself—headstock, bed, extra wide platen table—is *standard!*

Yet with the new Gisholt MASTERLINE Simplimatic Automatic Lathe, you have ample space for an *infinite* number of slide and tool arrangements. You can use front, center, rear and auxiliary slides—all moving at different feed rates—carrying enough tools to machine a maximum number of surfaces in a single chucking. All slides are easily mounted at correct angle to the work—keeping tool overhang to absolute minimum for increased rigidity and increased accuracy. And with the Simplimatic's table feed, tools can engage with the work or perform additional machining operations before actual slide movements begin.

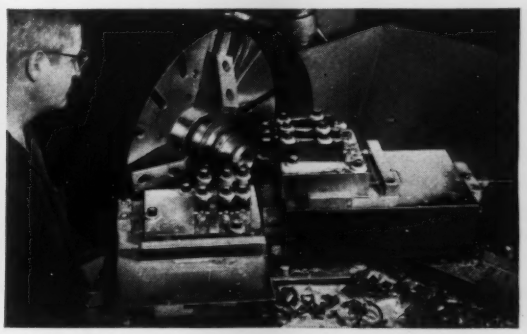
Because the Gisholt Simplimatic is a standard machine, it is *easy* to set up, operate and maintain. In many cases, the automatic cycle frees the operator to handle additional units or perform other work. And the basic design is readily adapted for work-handling devices, which even further simplify the operator's job and speed production!

Ask your Gisholt Representative to show you how efficiently the Simplimatic can handle your problem parts—using a simple, standard machine transformed by addition of standard tool slides, tool blocks and chucking equipment—performing *special* machine functions at *standard* machine prices! Call him today for full information on the Simplimatic!

Simplimatic setup for machining both ends of tractor rear axle housings in one chucking. Four tool slides are used, two at the front and two at the rear of the platen table. Machining includes turning and chamfering, forming and straddle-facing, with tool relief provided for facing tools on the rear tool blocks.



Six different sizes of tough steel oil well cutter bits are handled with ease and efficiency by this tooling setup. All slides and tools are placed at correct angle to the work. Tools are mounted on riser plates, permitting pre-setting for quick change-over and adjustment. Rigid support eliminates chatter on heavy forming cuts.



READY NOW! Write today for new Catalog 1159-A on Gisholt MASTERLINE Simplimatic Automatic Lathe. Fully illustrated—shows 31 typical jobs.

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GISHOLT MACHINE COMPANY

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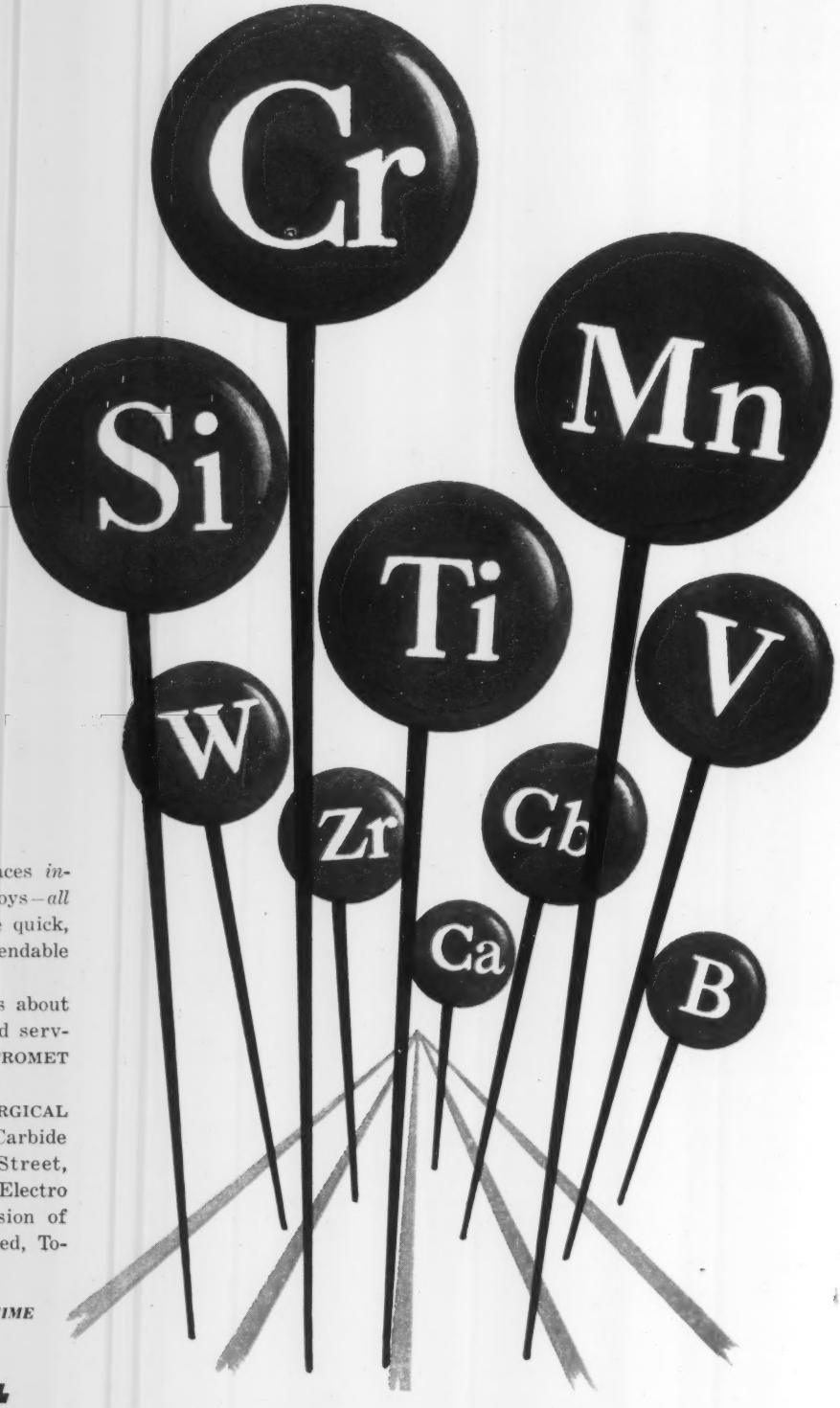

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A call to ELECTROMET places *instantly* at your disposal the alloys—*all* the alloys—you need. It's the quick, convenient way to assure dependable supplies of *whatever* you need.

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Write ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. *In Canada:* Electro Metallurgical Company, Division of Union Carbide Canada Limited, Toronto.

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WE HAVE IT! More than 100 different alloys are stocked and ready for immediate delivery at ELECTROMET. Alloys of the major elements including: Chromium, Manganese, Silicon, Titanium, Vanadium, Tungsten, Boron, Calcium, Columbium, Zirconium.

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Hamilton 400-ton 2-point eccentric press

Hamilton 500-ton 4-point eccentric press

Hamilton mechanical presses spell the maximum in versatility

No matter what your press requirements are, you probably won't have to incur the extra expense of special designing and "tailor-made" manufacturing if you explore the versatility of the two basic Hamilton press designs pictured above.

The Hamilton 400-ton 2-point eccentric press represents our conventional design, meeting all the basic needs of stamping plants all over the world. And it is so designed that many optional features may be readily added to transform it into a press capable of doing more highly specialized work.

Extra features include automation equipment, air and electric controls and outlets, die lights, die safety blocks, built-in uprights, provision for feeds, inbuilding and automatic circulating oil lubrication. These features are built into the 4-point press shown above. Let your Hamilton sales engineer discuss your needs with you.

Hamilton Division Hamilton, Ohio

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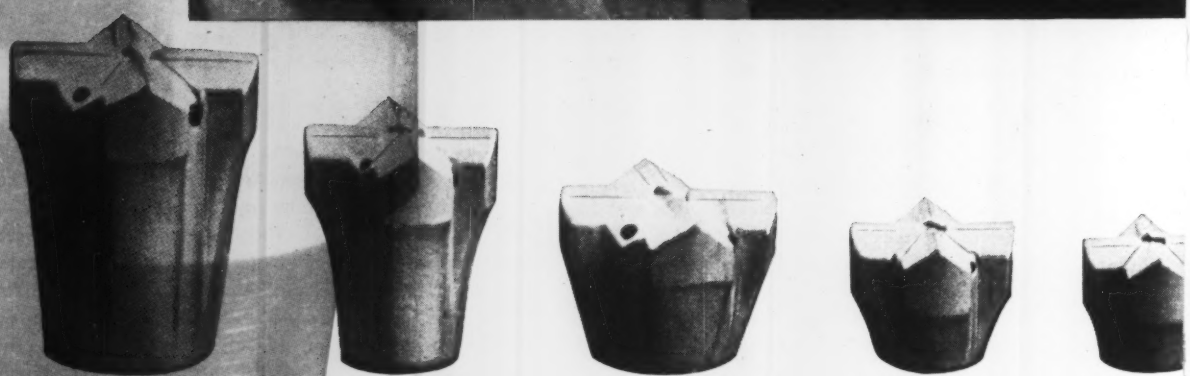
Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON

Bit manufacturer bites off

George P. Gaunt (right) shop superintendent shows rock bit to Joseph D. Grigas, industrial lubrication specialist at Standard Oil. Joe recommended switch to SUPERLA Soluble Oil. Joe is well qualified to make such recommendations. He has 13 years experience in such work, has a degree in engineering from Illinois Institute of Technology and is a graduate of the Standard Oil Sales Engineering School.



Brunner & Lay carbide insert rock bits are made from high chrome—nickel—moly steel, Rockwell 18C-22C hardness.

20% production increase

SUPERLA Soluble Oil plus technical service add up to improved product output at Chicago Brunner & Lay Rok-Bit Corp.

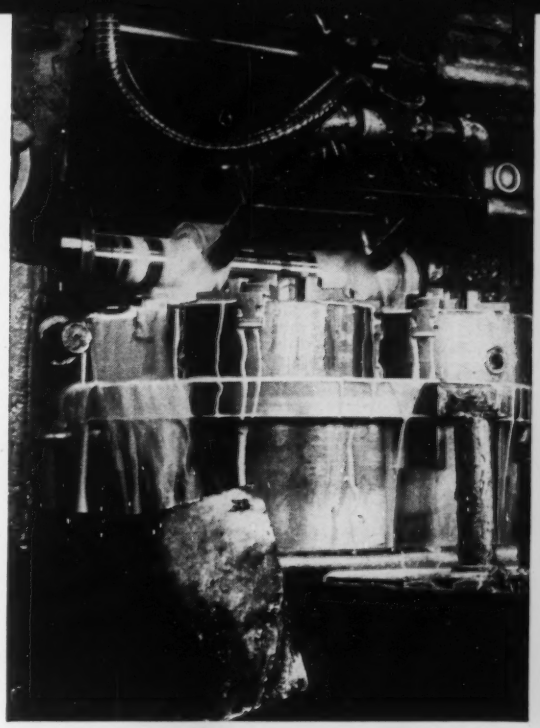
SUPERLA Soluble Oil, which is now being used by Chicago Brunner & Lay Rok-Bit Corp., has solved a lot of milling machine operating problems for the Company. Soluble oils formerly used separated out of emulsion and turned rancid in use. Oil circulating lines plugged repeatedly. The plant's production rate was not up to capacity because of frequent shut downs for cleaning of machines and for unplugging of oil lines.

On the advice of Joe Grigas, Standard Oil industrial lubrication specialist, the Company thoroughly cleaned the machines, then converted them to SUPERLA using the soluble oil at 10:1 dilution.

This is how the change-over worked out. *Production was increased 20%.* Machine down time was substantially reduced. The Company was sufficiently pleased with the performance of SUPERLA Soluble Oil in milling machines to convert two grinding machines to this oil. Results obtained on the grinding machines: excellent wheel life, good finish and rust protection of work and machines.

SUPERLA Soluble Oil emulsifies readily with all types of water. It is a stable oil and forms stable emulsions. It does not tend to develop objectionable odors in use nor is it injurious to men, work or machines. SUPERLA Soluble Oil gives good tool life and prevents rust.

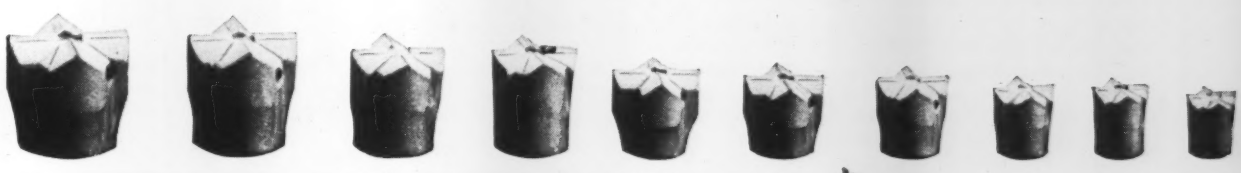
Get the facts about SUPERLA Soluble Oil. Your Standard Oil industrial lubrication specialist has them. In any of the 15 Midwest or Rocky Mountain states, one of these lubrication specialists is nearby. Call the one nearest you. Or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.



Milled slots up to ⅞" wide and 1" deep are made in this special alloy Rok Bit Steel in one cut. All of these milling machines use SUPERLA Soluble Oil exclusively.

Quick facts about
SUPERLA Soluble Oil

- **Emulsifies readily**
- **Forms stable emulsion**
- **Doesn't turn rancid**
- **Economical. Requires low emulsion concentrations**
- **Prevents rusting**
- **Non-injurious to men, machines, work**
- **Gives good tool life**

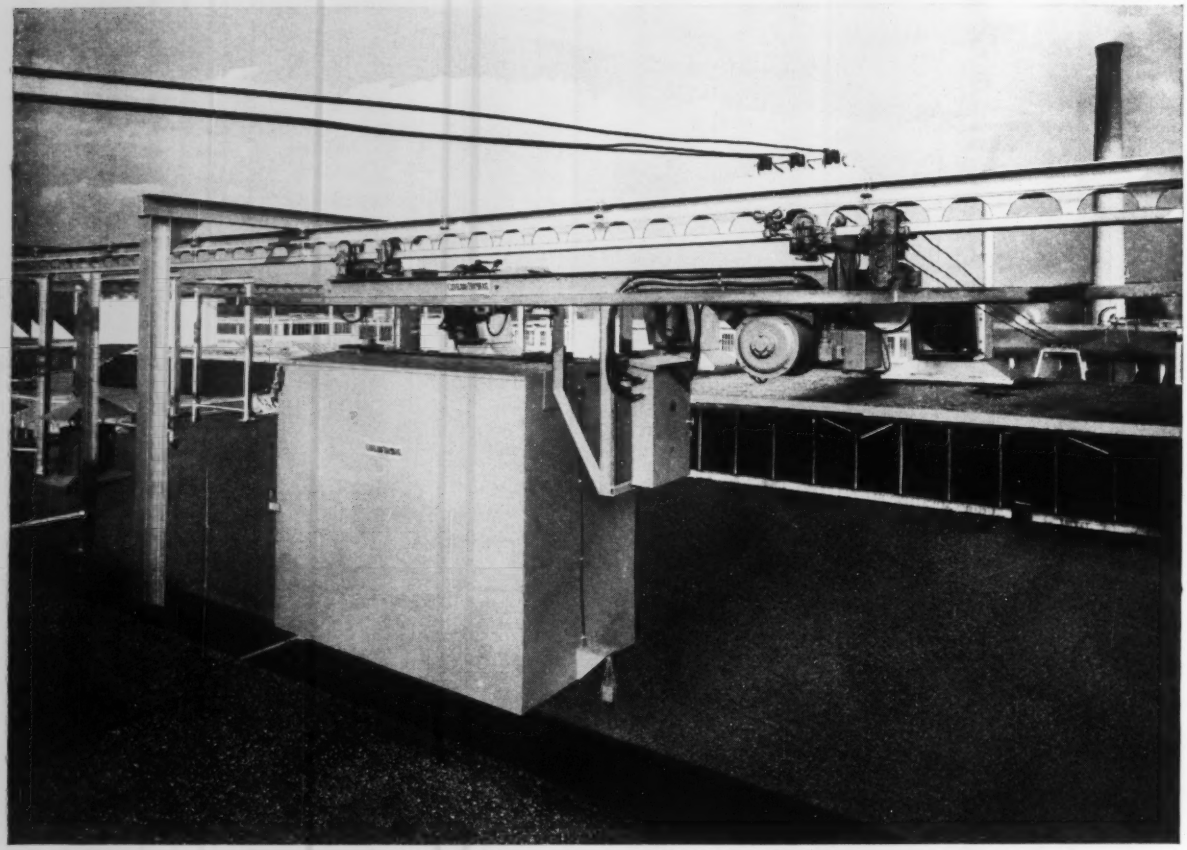


STANDARD OIL COMPANY (Indiana)

STANDARD

AUTOMATIC Materials Handling System Operates On Roof

Has paid for itself several times over since installed



THE box-like structure that you see in the photograph above is a traveling van that measures 4'-0" x 8'-0" x 6'-6" high. It is built into a motorized carrier that travels over an extensive Cleveland Tramrail system built on the roof of a large prominent plant.

A large door at the opposite end of the van is swung open during loading. Pallet loads of materials are brought inside the van and set in place. 3000 lbs. can be handled with this particular unit per trip. Other larger units are available.

No special operators are required for the Tramrail system, as it can be kept going easily by the production machine operators along with their regular work. After the van is filled, pressing a button starts the load on its way. The van first travels upward until it is above the roof. Then it goes forward over the extensive track system. When it reaches the roof over one of the two receiving stations, as preselected, it makes the vertical descent to the floor. Here the door is opened and materials removed.

This system brings distant departments close together so that they can operate as efficiently as if they were adjacent to each other. It eliminates need of wide load-carrying aisleways — and thereby saves considerable floor space. It avoids confusion and danger of floor trucks which would normally be required. It greatly cuts costs by drastically reducing time required for materials handling. In fact, the savings made by this system have been so great that it has paid for itself several times over since installed.

Very likely you, too, can make big savings by putting to work that big unused roof of yours. Cleveland Tramrail engineers stand ready to show you how.

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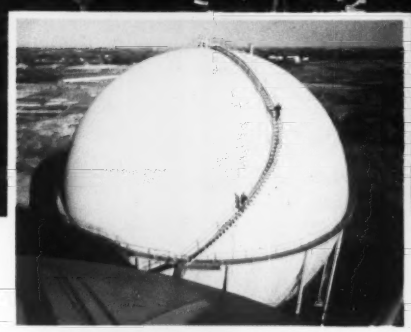
Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7820 E. 290th St. • WICKLIFFE, OHIO

IN TOKYO, JAPAN

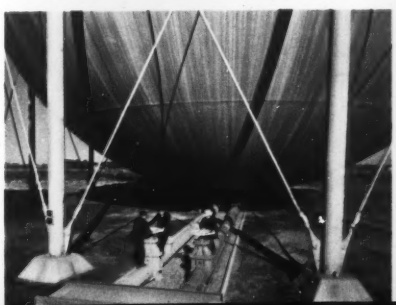
WORLD'S LARGEST USS "T-1" STEEL PRESSURE VESSELS

Beyond the Shinto shrine are the two USS "T-1" Steel spheres. They are being used by Tokyo Gas Works, Ltd., for the storage of natural gas at a pressure of 71.1 psi.



Lightweight construction—made possible by USS "T-1" Steel—cut shipping, handling and erection costs of these giant pressure vessels.

Thinner walls meant less weld metal required, less erection time needed. Lightweight construction also reduced amount and expense of foundation.



COMPARED TO CARBON STEEL CONSTRUCTION, the use of USS "T-1" Steel saved 1,720 tons of steel in the two giant pressure vessels pictured here. Having a diameter of 110.5 ft. each, they are the largest Hortonspheres ever built for the storage of gas. USS "T-1" Steel enabled Chicago Bridge & Iron Company to use 0.73-inch-thick shell plates rather than mild steel plates 1.75 inches thick.

USS "T-1" Steel's very high yield strength (90,000 psi minimum), plus previous experience in building non-code government vessels, permitted use of a maximum allowable working stress of 36,000 psi to which a 90% weld joint efficiency was applied. With the exception of the working stress values, the vessels were built to the ASME Code for Unfired Pressure Vessels where applicable.

In addition to saving 1,720 tons of steel, the thinner USS "T-1" Steel plates drastically lowered the cost of shipping to Japan. And each ton saved meant lower erection, welding and foundation costs. Added up, all these savings point out why the use of USS "T-1" Steel spells economy.

Shell plates were fabricated at CB&I's Greenville, Pa. plant and shipped to Tokyo for field erection. Field welding was done with E 12016 electrodes and did not require stress relief. All welds were 100% X-rayed.

Two additional vessels of similar design, but smaller in size, are now being fabricated by Chicago Bridge & Iron for installation in Tokyo.

USS "T-1" Steel is being used to improve performance and reduce costs in a wide variety of applications in steel mills, in mining equipment, in construction equipment, in materials handling equipment, in bridges, and even in steam turbines. Write for complete information about its application and fabrication. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

"USS" and "T-1" are registered trademarks.

UNITED STATES STEEL

Watch the **United States Steel** Hour on TV every other Wednesday (10 p.m. Eastern time).

USS

"These rings were expanded 30 per cent...cold"

says **Robert Leith,** *Division Metallurgist at U. S. Steel's Homestead Forgings Division*

The forged rings in the picture will be installed near the ends of a rotor on a very large generator and are used to retain its copper coils. The rings are *non-magnetic*, thereby reducing flux leakage that will heat the ends of the stator coil and stator windings. Thus, you end up with a more efficient generator when you design it with these non-magnetic coil support rings.

To produce non-magnetic rings, an austenitic manganese-nickel-chromium steel was used for these USS Quality Forgings. But, since this austenitic steel cannot be heat-treated to the required strength levels of 150,000-160,000 psi tensile strength, the rings were *cold-expanded* to obtain the required properties.

This cold-expansion process requires extreme care and skill, especially when you consider that the rings are expanded as much as 30 per cent. Intricate tooling setups were required and we called on the finest talents of our staff at the Homestead Forgings Division.

As much as anyone else, Robert Leith keeps a close eye on these USS Quality Forgings as they are produced. He supervises a metallurgical staff of nine and an inspection staff of 17. It is fitting that he is in charge of these two groups, because Mr. Leith has spent 16 years in the Homestead Forgings Division—six in inspection, 10 in metallurgical. Few men anywhere are more qualified to determine the quality of forged steel products.

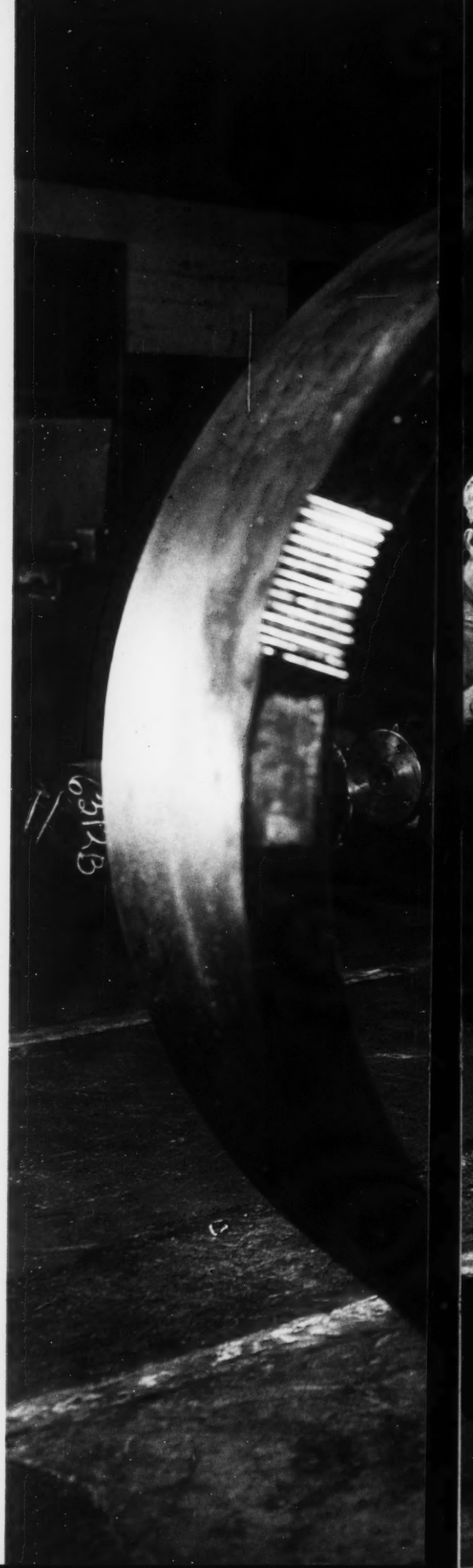
There's a good chance you're not interested in non-magnetic retaining rings—but no matter what kind of forging you buy from United States Steel, you can be sure that money won't buy anything better. Please address inquiries or requests for our free 32-page forgings booklet to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

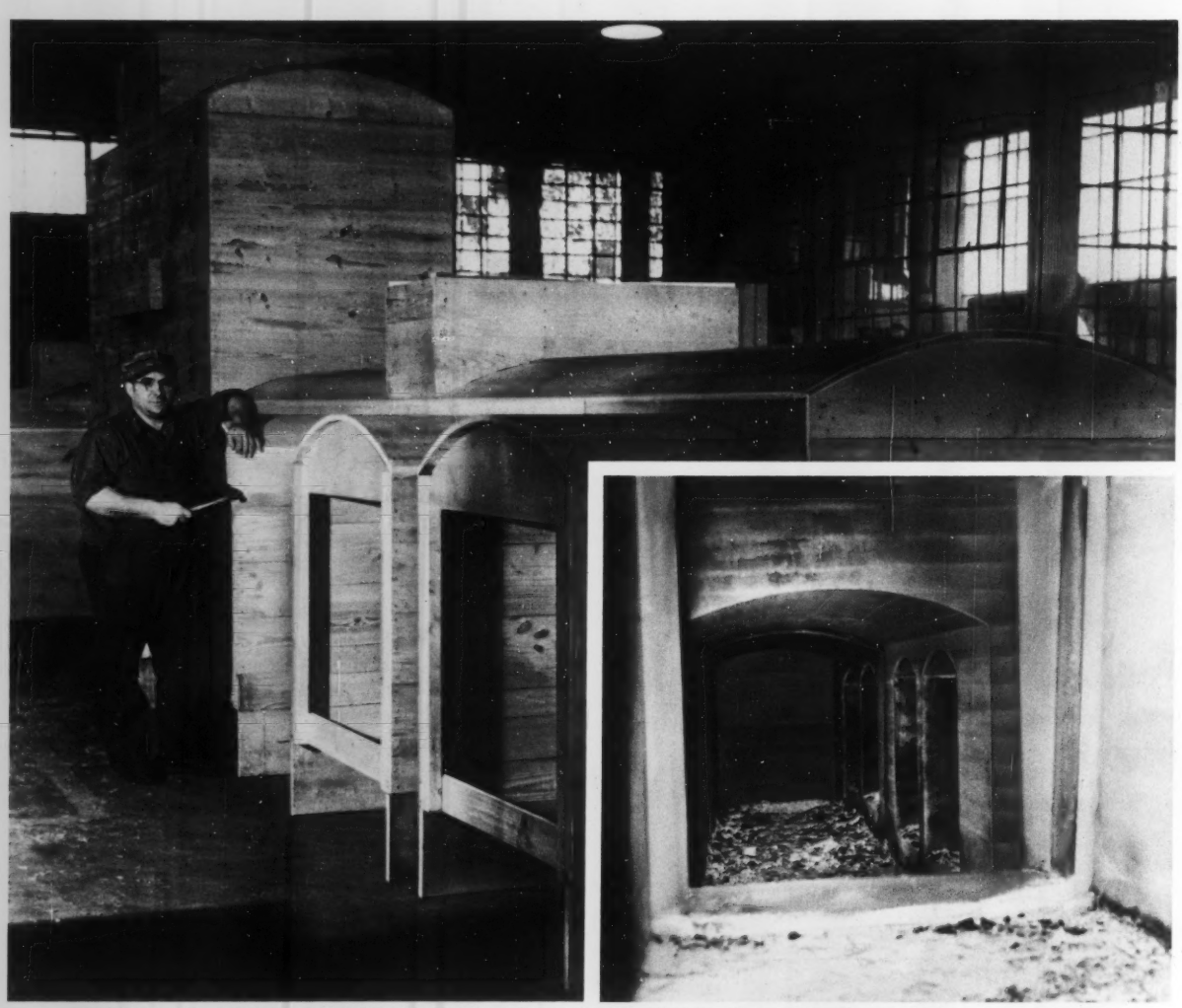
USS QUALITY FORGINGS

heavy machinery parts . . carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types

USS

UNITED STATES STEEL





SUBSTANTIAL TIME AND COST SAVINGS resulted from the installation of Lumnite-Crushed Firebrick concrete in the flues of open-hearth furnaces, John A. Roebling's Sons Corporation steel plant, Roebling, New Jersey. Since Lumnite-made concrete was substituted four years ago, trouble-free service has resulted.

Flue construction and installation is easier with refractory concrete made of ATLAS LUMNITE* Cement

- Lumnite-made refractory concrete has greater resistance to thermal shock, to volume changes and severe service conditions.
- Repairs and downtime are reduced to a minimum.
- Placement is fast and easy – service strength is reached within 24 hours.

For maximum convenience, use Lumnite-made castables. These are packaged mixtures, ready for use. Just add water, mix and place. Made and distributed by leading manufacturers of refractories.

For more information, write: Universal Atlas, 100 Park Avenue, New York 17, New York.

* **"LUMNITE"** is the registered trademark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

L-152

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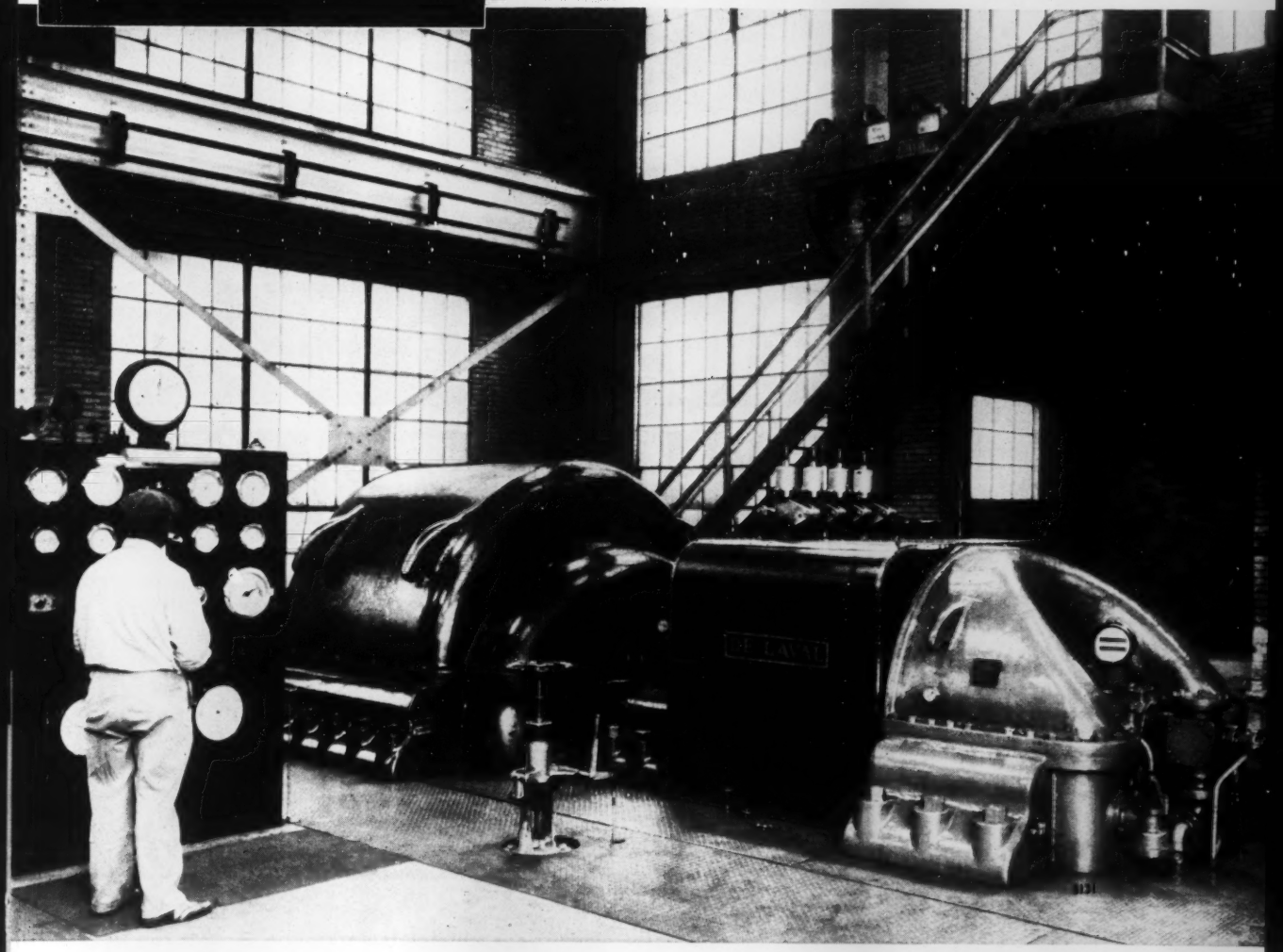
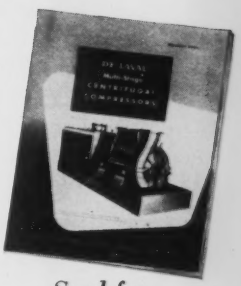
DE LAVAL
BLAST FURNACE BLOWERS

give 20 years of service at Great Lakes Steel Corp.



Shown is one of two De Laval centrifugal blast furnace blowers at the Ecorse, Michigan, plant of the Great Lakes Steel Corporation, Division of National Steel Corporation. This 85,000 cfm unit was installed twenty years ago; another 75,000 cfm unit went on the line a year earlier. Both have given dependable round-the-clock service ever since. These turbine-driven blowers are hooked up to a multi-head which enables either one to be used in conjunction with any of the three blast furnaces.

De Laval centrifugal blowers are built in single and multi-stage types to supply air in volumes up to 150,000 cfm for all classes of service in steel, gas and coke plants. The wealth of application experience acquired by De Laval over the years assures a correct and economical solution to your blower problem.



Send for Bulletin 0504

DE LAVAL *Centrifugal Blowers*

DE LAVAL STEAM TURBINE COMPANY
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DL-381

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A trial order will convince you.

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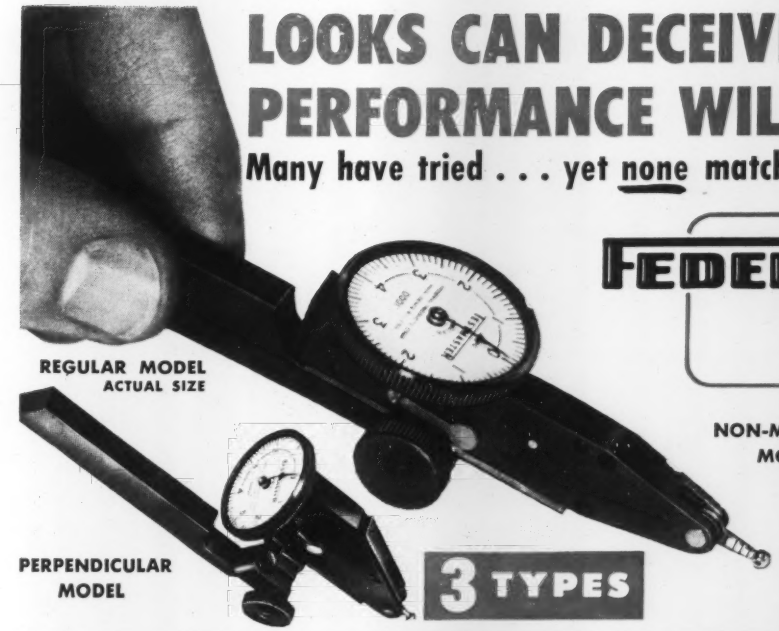
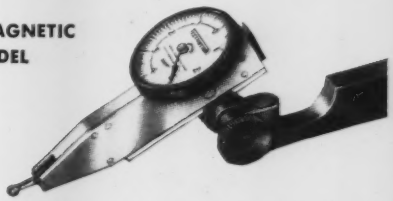
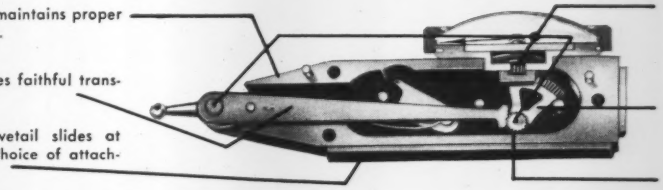




WHY the Testmaster is so Amazingly accurate

Its Movement is designed and built by the world's foremost gage specialists



Rigid case construction maintains proper alignment of Movement.

Rigid steel lever provides faithful transfer of point motion.

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Jeweled bearings throughout assure low friction operation and maximum sensitivity.

Accurate crown gear provides simple, direct, low friction transfer of lever movement to hand . . . *and uniform wear.*

Gears are precision hobbed for maximum Accuracy.

HARD CHROMED, PRECISION INDEX POINTS

Tungsten tipped points are also available for extra durability.

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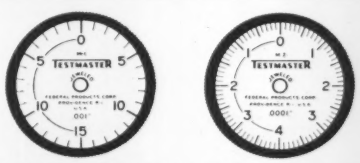

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Many universal test indicators are "look-alikes". **Each year it seems somebody else decides to copy the Federal Testmaster. But however closely its *appearance* is imitated, you can always tell the Testmaster by its accuracy.**

No other gage has a Movement like the Testmaster. Actuated by a lever and crown gear, and with jeweled bearings throughout, the Testmaster has exceptional sensitivity and *long, repetitive* accuracy throughout its range. Its time-proven Movement is not to be confused with "spiral groove" gages whose accuracy is uncertain or with other Movements where friction, looseness of fits, end shake in pivots, and uneven contact pressure contribute to unreliable performance. The Testmaster is designed by the world's largest gage manufacurer and is ruggedly constructed to give lasting service in the shop or toolroom where the variety of its applications is almost limitless. For information and prices, write . . .

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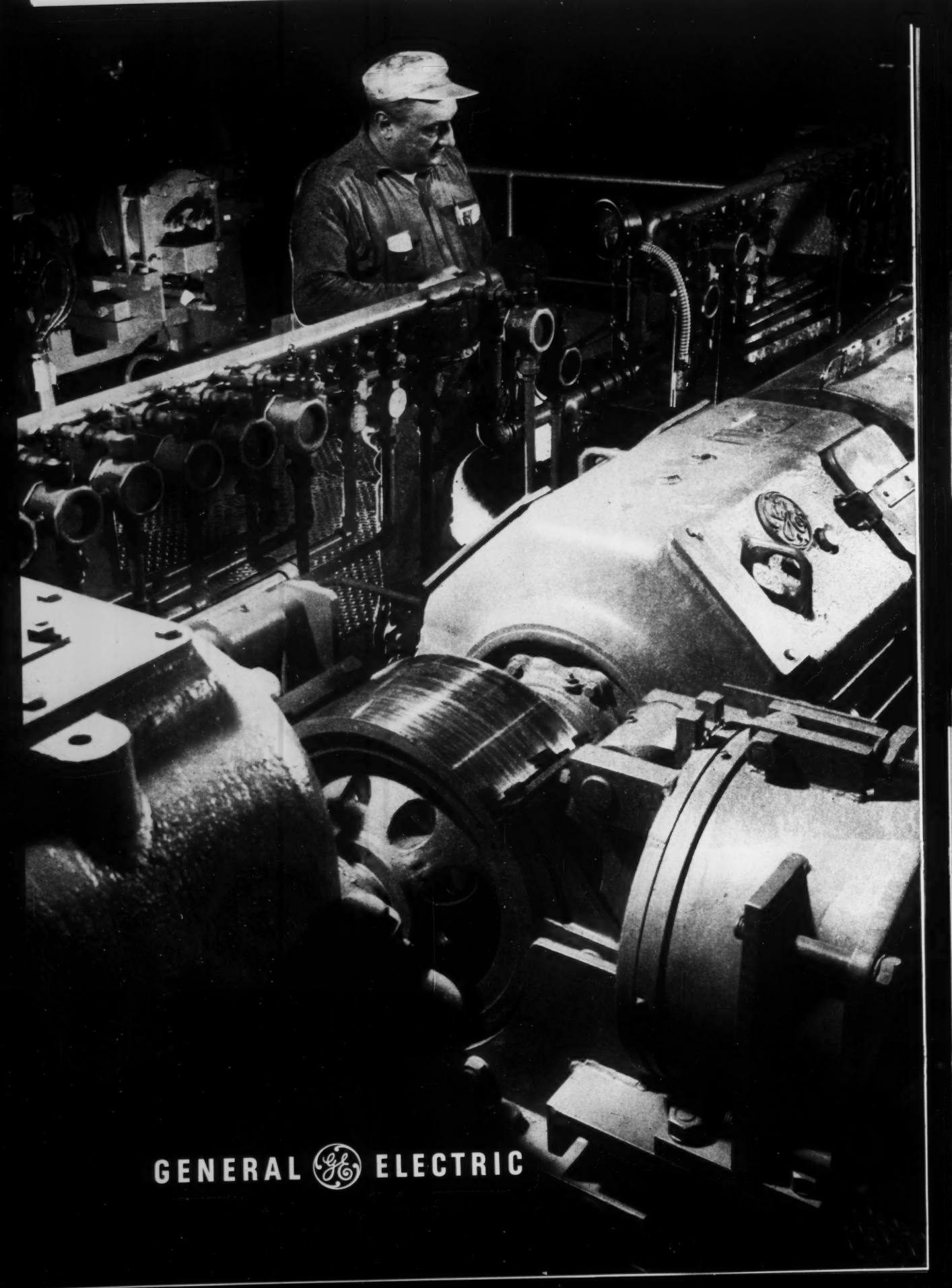
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In steel mills, on cranes, on power shovels—on any application where severe operating conditions exist, General Electric's Armored Motors are on the job. ***In all frame sizes***—402, 602 through 624, MD motors meet or better the high standards of the Association of Iron and Steel Engineers.

Where minutes mean money—In the process industries, any "downtime" can cause staggering losses. MD-600 motors have that ***added protection*** that gives steadier production—fewer unplanned shutdowns.

Class H insulated coils, standard in all MD-600 motors, give greater thermal protection, longer insulation life—an unmatched level of dependability. Insulation failure and motor roastouts have been virtually eliminated!

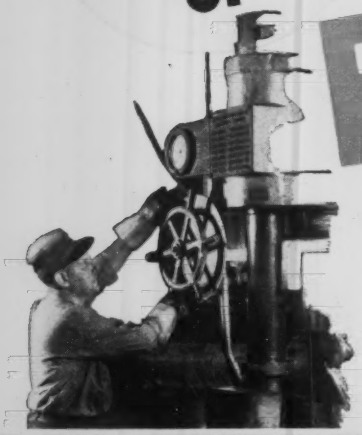
Specifically designed for the most rugged production applications, General Electric MD-600 motors provide high acceleration, deceleration and reversing to deliver peak horsepower faster and more efficiently. They will perform continuously under extreme strains of mechanical shock, high temperature and in the corrosive presence of dirt, steam and water.

Engineering help—If you would like to know more about the MD-600 motor line, we would be pleased to have a General Electric Industrial Specialist call on you. Or, if you prefer, we will send you copies of GEA-5654. Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania. 811-4

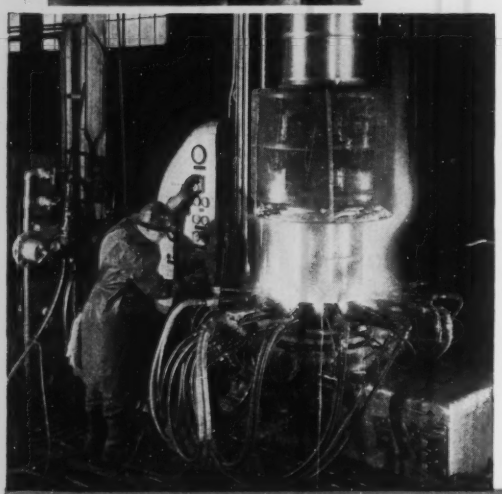
Progress Is Our Most Important Product

GENERAL ELECTRIC

YOU CAN'T BEAT THE COMBINATION OF SKILLS and EQUIPMENT



...which ONLY the Commercial Heat Treater can provide



Today's modern commercial heat treating plant might well be described as a "department store" for metal treating services. For under one roof are offered you not only the full range of heat treating equipment for all types of processes . . . but . . . of still greater importance, the manpower skills of the management and technicians of those supervising and performing your jobs. *Service* is their keynote.

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BUY PROFIT IN ALCO CIRCULAR FORGINGS

Hi-Qua-Led® Steel forgings, available in any AISI Open Hearth Grade, can reduce machining time more than half, or increase tool life up to 1600 per cent. ALCO's experience and equipment build cost-reducing uniformity into standard circular forgings from 18- to 145-in. OD.

The big news is Hi-Qua-Led Steel. It was developed by ALCO to lower your machining costs on circular forgings — particularly in applications where a lot of metal must be removed. So far, customers using Hi-Qua-Led Steel forgings have reported as high as 69 per cent improvement in turning time, 41.2 per cent in teeth-cutting time. Hobbing tool life has been increased up to 1600 per cent. Even surface finish has been improved markedly.

There is no change in steel properties in Hi-Qua-Led Steel. It can be expected to perform exactly like a regular steel in the same grade. Customers report same response to heat treatment as regular steels.

You can profitably use Hi-Qua-Led Steel forgings if you put four or more hours machining into a circular forged piece, or if you do hobbing or other tough machining jobs with expensive tools. If your machining is not extensive, ALCO's regular circular forgings can still save you money with their high uniformity and exact conformance to your specifications.

We'd like you to have full information. Your nearest ALCO sales office will be happy to provide it, or, if you wish, you can receive complete explanatory information in Bulletins SF-1 and SF-2 by writing Spring & Forge Division, Dept. OCF-1, P.O. Box 1065, Schenectady 1, New York.

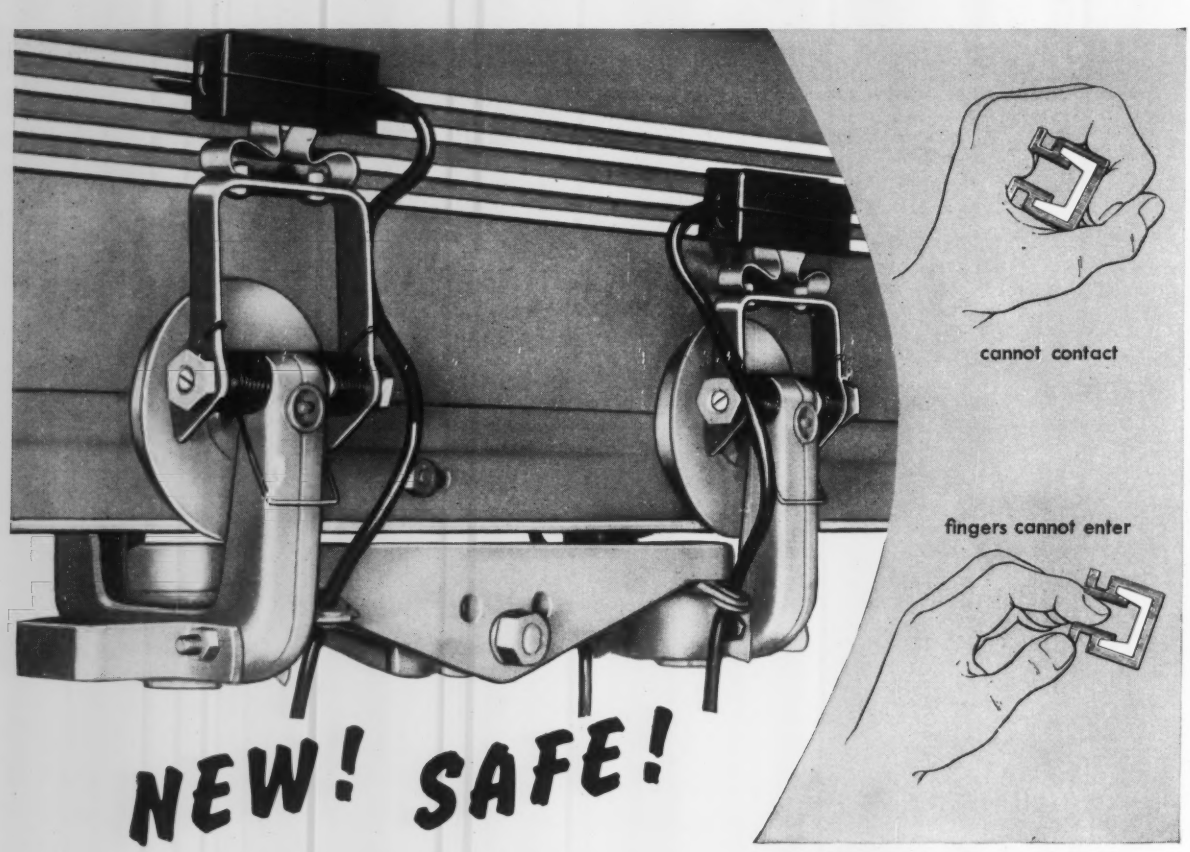
ALCO

ALCO PRODUCTS, INC.

NEW YORK

Sales Offices in Principal Cities

Locomotives · Diesel Engines · Nuclear Reactors · Heat Exchangers · Springs · Steel Pipe · Forgings · Weldments · Oil-Field Equipment



NEW! SAFE!

AMERICAN MONORAIL

KANT SHOCK

SHIELDED ELECTRIFICATION

For Monorail Track and Crane Systems

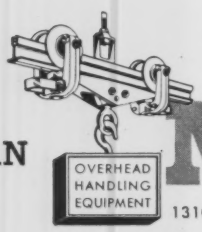
By covering its standard bus bar electrification with a specially designed polyvinyl chloride extrusion, American MonoRail now furnishes completely safe electrified systems.

This KANT-SHOCK shielding absolutely prevents accidental contact with live bus bars. It is impossible for an adult's finger to enter the shield.

A new type sliding shoe collector provides a floating contact throughout a monorail system regardless of any misalignment due to bent bars or at switch and inter-lock connections.

KANT-SHOCK Electrification positively eliminates all the hazards of open bar conductors — prevents costly accidents — protects employees — reduces insurance rates.

Write for KANT-SHOCK Bulletin KS-1

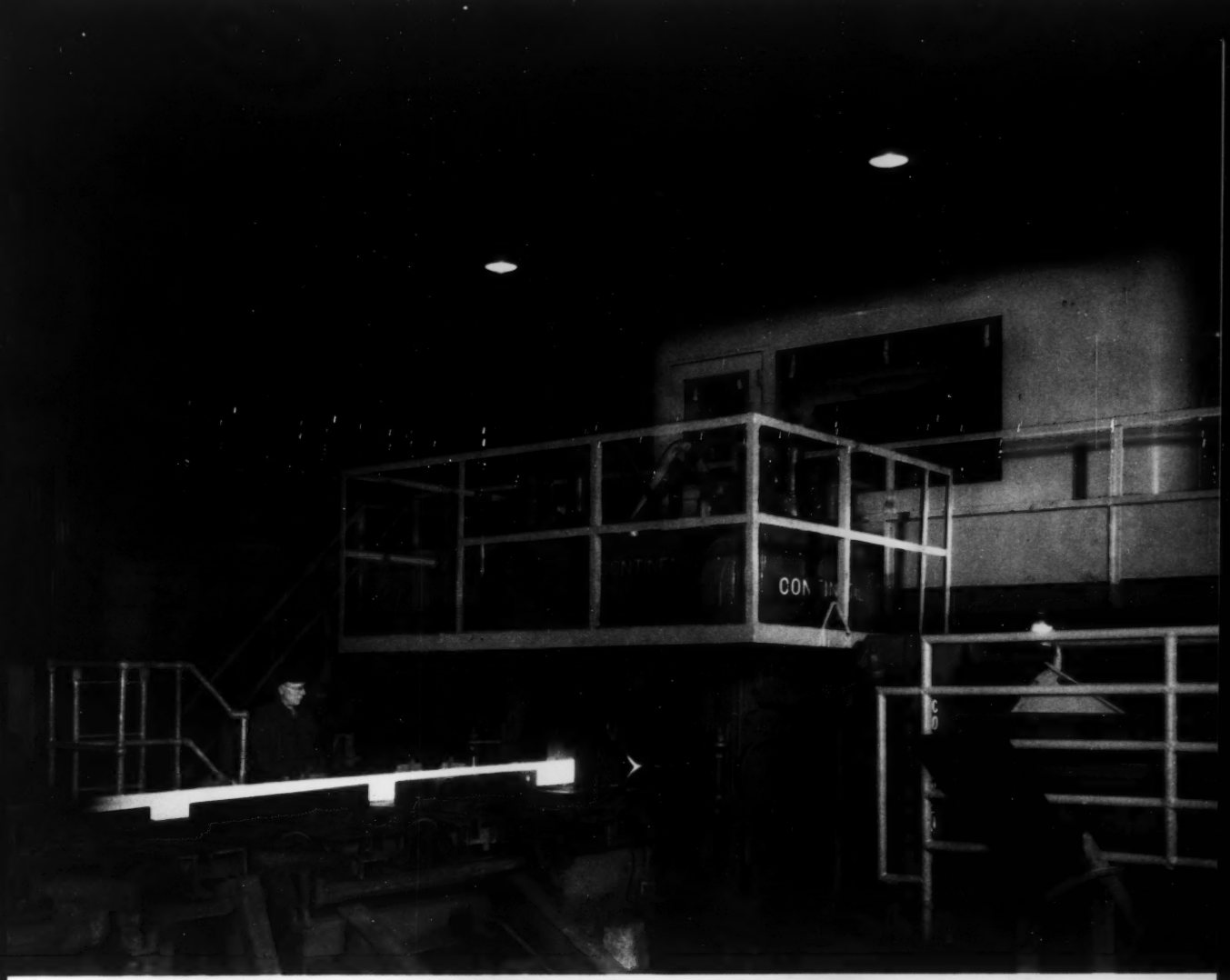


Member of Materials Handling Institute and Monorail Manufacturers Association

For Power Driven Conveyors, Use Landahl Chainless Conveyors

AMERICAN MONORAIL COMPANY

13102 ATHENS AVENUE, CLEVELAND 7, OHIO (IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)



Merchant Mill roughing stand

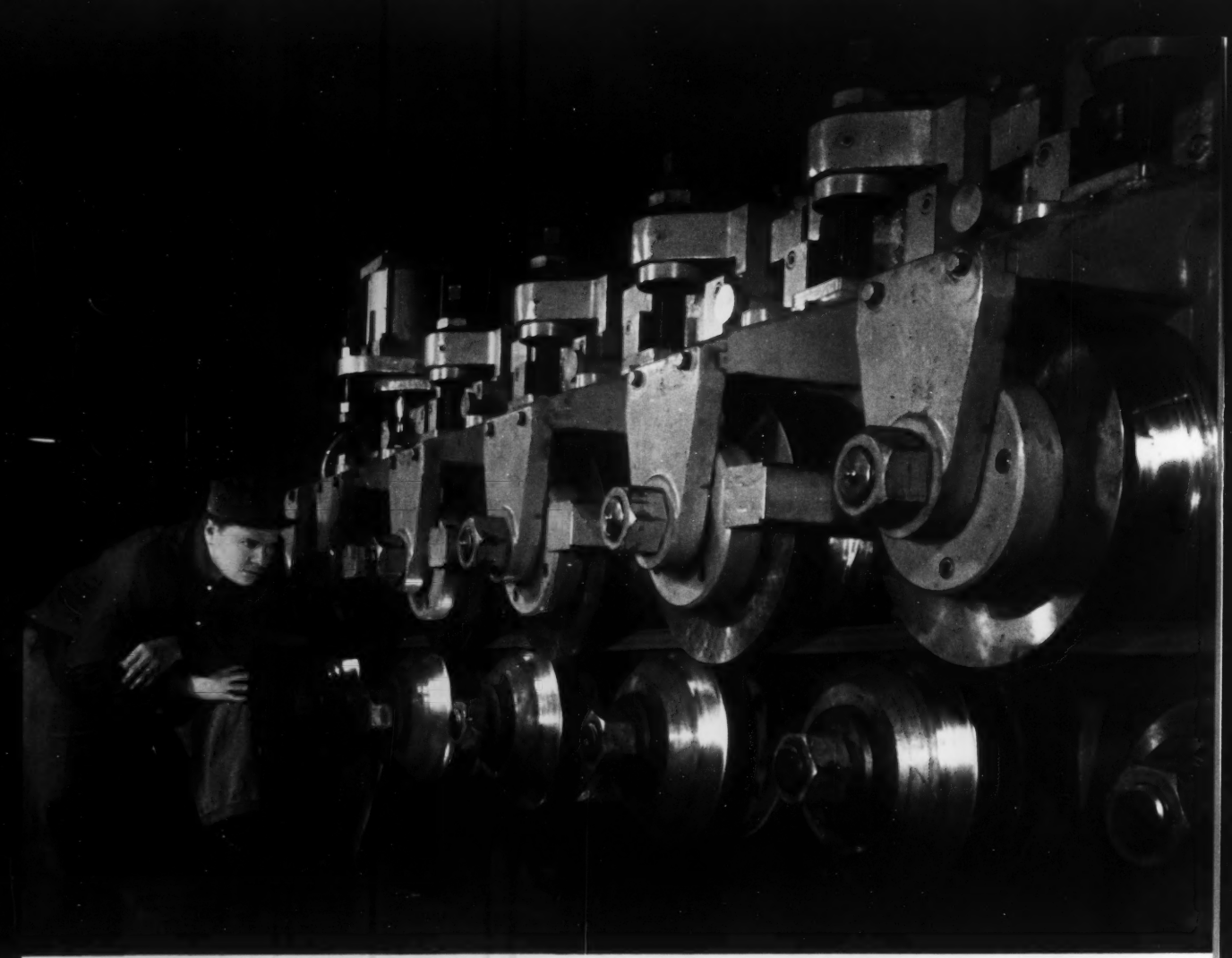
BLAW-KNOX MERCHANT MILLS

Blaw-Knox designs and builds Merchant Mills in a complete range of sizes, complete with auxiliary equipment to meet individual requirements. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron, and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building · 300 Sixth Avenue
Pittsburgh 22, Pennsylvania



Blaw-Knox-Medart straightener installed at Jessop Steel Company's Bar Mill at Washington, Pennsylvania

BLAW-KNOX Medart straightener cuts time 75% on stainless bars and shapes!

This 11-roll Blaw-Knox–Medart shape straightener installed at Jessop Steel's bar mill does its job 75% faster than the equipment it replaced. This increased performance is due to two exclusive Medart features. All straightening is done in a single pass, cutting handling time to the bone. And set-up time is only a matter of a few minutes, can be accomplished easily to handle a wide variety of flats, squares, and angles.

Profit-wise companies throughout the industry are experiencing results like this on *tough* straightening jobs as well as standards.

Blaw-Knox–Medart machines are the most complete line of shape straighteners in the world. Their exclusive features are engineered for uniform, high output. You can get any combination of overhung or yoke-mounted rolls, fixed or variable centers, for fast, one pass straightening of square or hex's from ¼″ to 4″ and flats up to 1″ x 6″. Medart machines for larger sections such as structural shapes can be specially adapted for your requirements. Your Blaw-Knox–Medart sales-engineer can help you apply Medart machine exactly suited to your operations.

BLAW-KNOX

BLAW-KNOX COMPANY

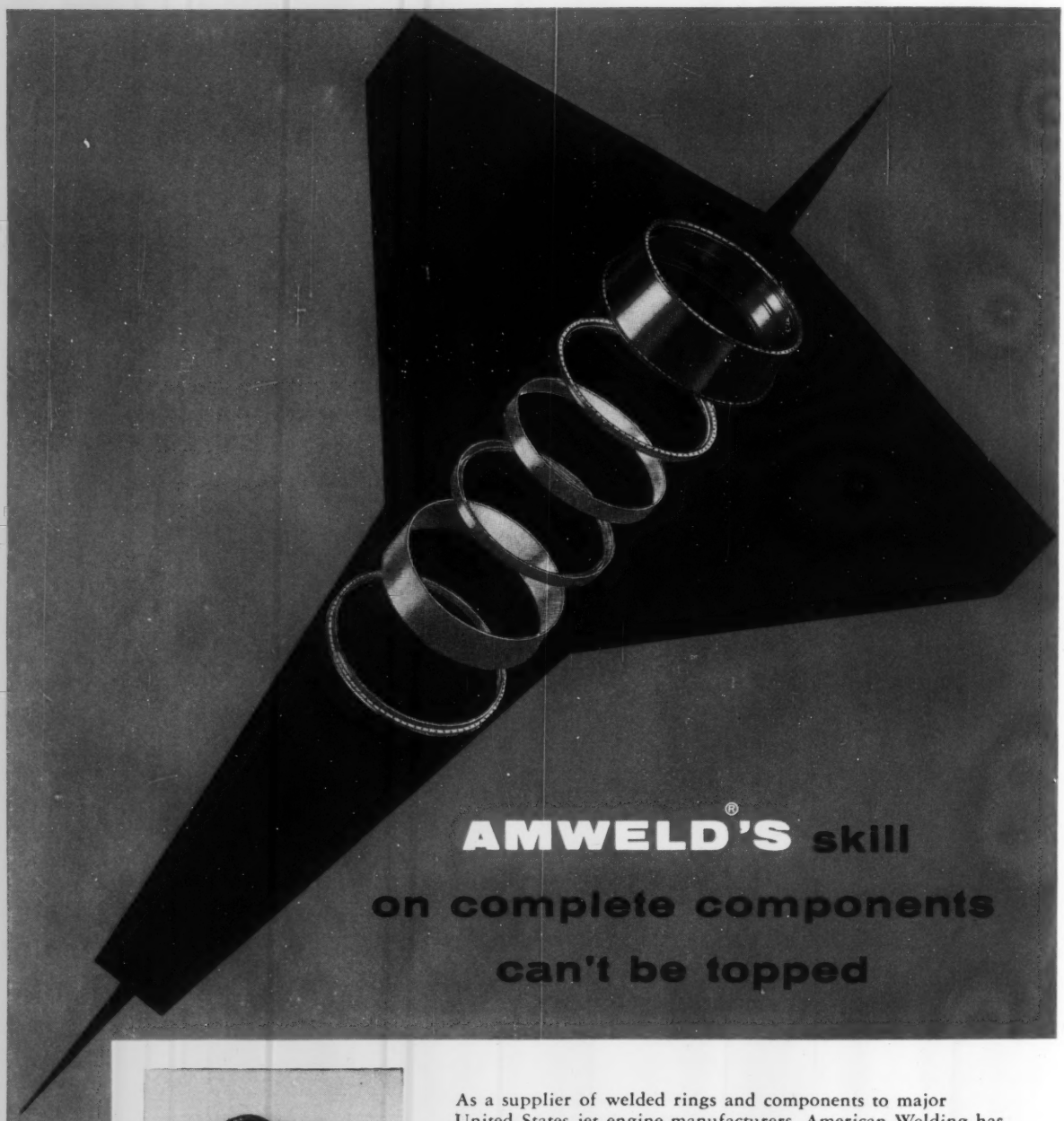
Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Roebling Royal Blue Wire Rope goes to any length to prove its **high strength!**

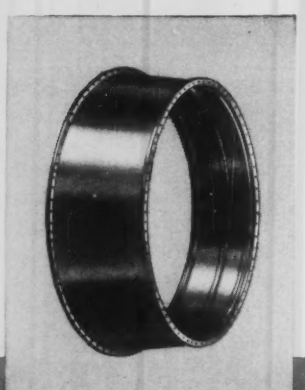
Every inch of every foot of Royal Blue is stronger than any rope you've ever used on *any* job. This on-the-job tenacity helps to make it the most widely and readily accepted rope in Roebling's history. It is but one of Royal Blue qualities that makes for its long service life--on any job you choose. For full details on Roebling Royal Blue Wire Rope talk to your distributor or write to Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey, for your copy of "*Wire Rope Recommendations and Catalog*."

ROEBLING

Branch Offices in Principal Cities—Subsidiary of The Colorado Fuel and Iron Corporation



AMWELD® S skill
on complete components
can't be topped



As a supplier of welded rings and components to major United States jet engine manufacturers, American Welding has proven its skill as part of an industry where cost and precision are vital factors. As the missile and rocket programs grow from the experimental to the production stage, Amweld's experience and skill can play a part in these essential programs.

If you have a problem that can be solved by a rolled and welded ring or component, or any welded fabrication, contact American Welding's Industrial Products Division. Their skill, experience, and engineering are at your service.

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AMERICAN WELDING
The World's Leading Manufacturer of Welded Rings

Metalworking Outlook

Tool Shipments, Orders Up

Look for 1957 machine tool shipments to reach at least $950 million. The National Machine Tool Builders' Association reports that gross new orders for the industry amounted to $53.8 million in June, up 17.5 per cent from May's. Shipments of $83.1 million, up 5.8 per cent, reduced average backlogs to 4.2 months. One-shot cancellations of Air Force contracts amounting to about $7 million, plus normal cancellations, brought the total to nearly $11 million and resulted in net new orders of $42.9 million. No more sizable cancellations are expected from U.S. agencies in the foreseeable future.

AF Shift: Effects Appraised

A continuing STEEL survey of the aircraft industry, following the Air Force's cutbacks, shows: About 70 per cent of International Business Machines Corp.'s aircraft and missile contracts will be subcontracted next year (the same as in '57). Some 64 per cent of Bell Aircraft Corp.'s sales will come from the AF in '58, compared with 66 per cent in '57. Other defense work will increase from 13 to 14 per cent of sales; subcontracting will continue at its present 30 per cent rate. Garrett Corp. believes AF contracts will drop to 56 per cent of sales in '58, compared with 60 per cent this year; other defense work will increase from 15 to 16 per cent of sales; aircraft-missile subcontracting next year will be cut to 10 per cent, compared with 50 per cent in '57; capital expenditures originally planned for next year will be reduced. Lockheed Aircraft Corp. expects its subcontracting level to remain stable through '58 (35 per cent of its airframe manufacture is done by 14 major subcontractors).

Mr. Hebert and GM

Rep. F. Edward Hebert (Dem., La.) started his Armed Services subcommittee's investigation last week to hunt for excessive profits among 15 military aircraft engine makers. He wound up trying to tree General Motors Corp., charging the firm had made $17.5 million too much out of a contract to build F-84-F fighters. GM will stand up and fight. It says it made only 5.4 per cent after taxes. After all the GM publicity, Representative Hebert will hurriedly finish investigating the 15 engine firms. He picked the jet industry at a bad time, with the AF cutbacks hitting them. Republicans on the committee label the whole study "politics."

First Half Steel Earnings

Here's how steel's first half net earnings compare with those of the same period last year: Alan Wood Steel Co.—$936,000 vs. $1.3 million; Colorado Fuel & Iron Corp.—$8.9 million vs. $8.7 million; Continental Steel Corp.—$1.7 million vs. $1.6 million; Crucible Steel Co. of America—$6.0 million vs. $8.1 million; Jones & Laughlin Steel Corp.—$26.6 million vs. $30.9 million; Kaiser Steel Corp.—$14.9 million vs. $11.7 million; Lone Star Steel Co.—$6.7 million vs. $4.8 million; Republic Steel Corp.—$52.9 million

Technical Outlook—p. 111 Market Outlook—p. 163

vs. $51.5 million; Youngstown Sheet & Tube Co.—$21.9 million vs. $21.5 million.

J&L Buys Texas Land

J&L has acquired a large acreage in Texas in what it calls a "first step" toward building a steel plant. The 2700-acre tract fronts on Galveston Bay. The company emphasizes that it "is not planning to proceed with construction in the near future."

No Senate Probe of Autos?

Latest rumor has it that if the steel industry makes a good case for itself before Sen. Estes Kefauver's committee investigating big business (see page 76), the auto industry won't even be called. The senator has been unsuccessful in getting any economist to wholeheartedly damn big business. Also, the civil rights debate has so tied up the senators that there's little time for Kefauver committee hearings.

GNP Hits Record

Gross National Product hit an annual rate of $433.5 billion in the second quarter. That compares with $429.1 billion in 1957's first quarter, $410.8 billion in 1956's second quarter and $414.7 billion for all of 1956. GNP in the first half this year registered a 6 per cent gain over that of the first half last year.

Memo on Labor

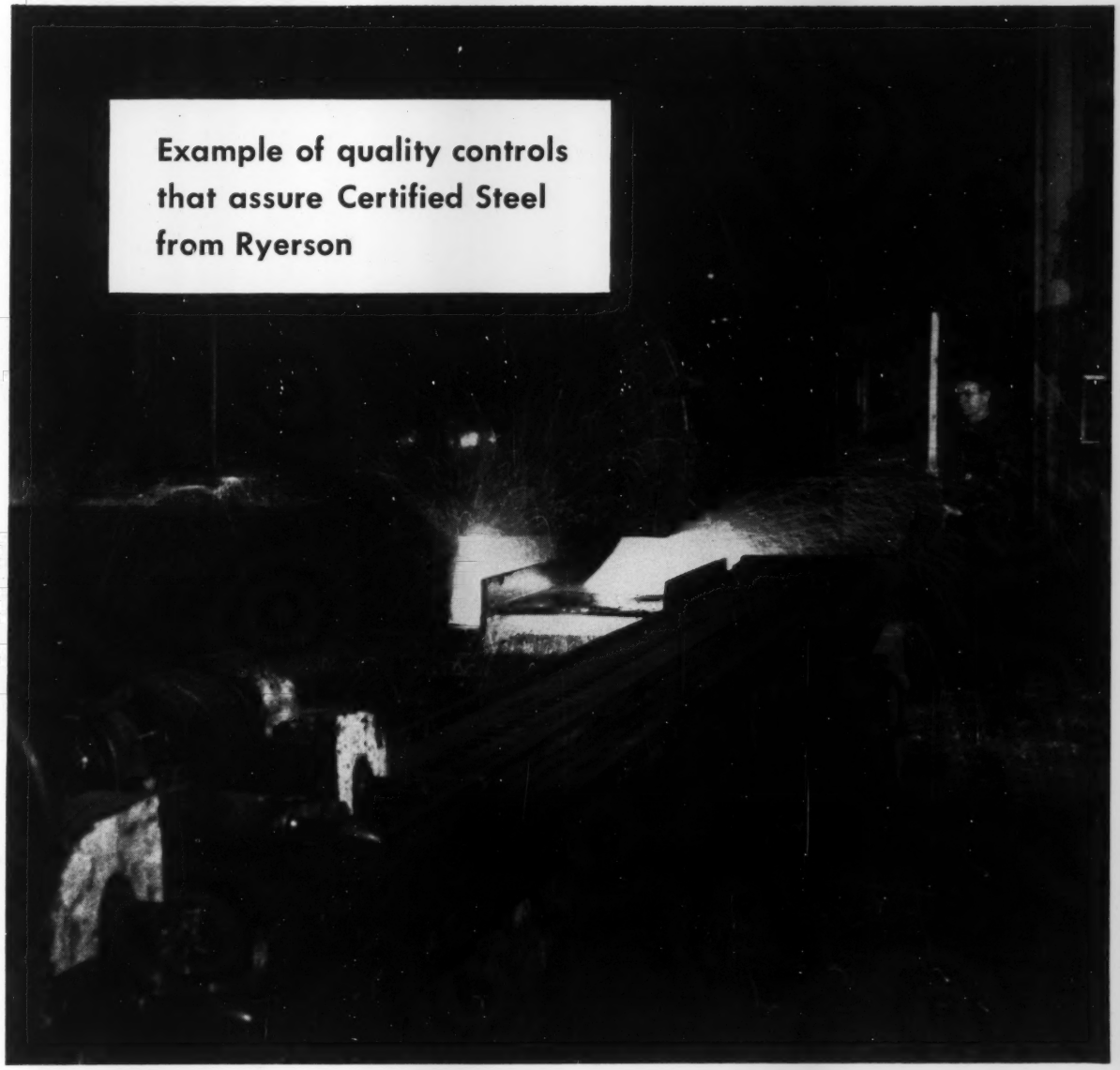
Man-days lost because of strikes through May this year were the lowest in a decade—5.7 million, compared with 10.9 million in the same 1956 span . . . For the time being, look for John L. Lewis to pass up the chance to win more money for coal miners; the soft coal contract is reopenable on wages after Aug. 1 . . . A good bet: Teamster Vice President James Hoffa will seek the presidency of his union now that he has been acquitted of bribery charges; if he wins, the union will be expelled from the AFL-CIO . . . Donald Rarick, rebel in the United Steelworkers, will hold a "convention" in September.

Prices of the Week

Fruehauf Trailer Co. increased prices on "popular" lines of trailers 3 to 5 per cent . . . General Electric Co. cut prices from 42 to 75 per cent on its complete line of high frequency tetrode transistors used in radar, television amplifiers and two-way radio equipment. Higher production and better reject ratios account for the reductions.

Straws in the Wind

The rate of new business incorporations in June (11,154) fell moderately below that of the previous month and June, 1956—the fifth consecutive month that statistic has been below the year-ago level . . . Radio-Electronics-Television Manufacturers Association will change its name to Electronic Industries Association . . . RETMA says 333,921 television sets were shipped in May, compared to 329,710 in April . . . Proposal for a federal agency to buy rail equipment met a cool response in Congress.



Cuts 24" beams in 12 seconds!

When this big friction saw cuts cold steel like hot butter it also completes one more step in the quality control of Ryerson steel.

A new method of blade alignment and an automatic gauge of our own design assure a remarkably straight, true cut—and frequent blade changes result in minimum burr!

This kind of control is typical of the exacting attention we give to every operation. As a result, we achieve far greater accuracy than called for in standard tolerance tables—almost without exception.

Certified cutting of Ryerson steel and the over-all control of Ryerson steel quality are important points to remember when you're specifying or buying steel from stock.

RYERSON STEEL

In stock: Carbon, alloy & stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

1957 FORD FAIRLANE 500 SUNLINER

PHOTO: COURTESY FORD MOTOR COMPANY

DSC *RBF* STRIP Scoring 100% Job-Performance on '57 Ford Radiator Grilles, Repeating '56 Record

THE FACTS OF THE CASE—Continuing its '56 record, DSC *RBF* STRIP is giving two Ford vendors 100% job-performance in their production of '57 Ford front-end grilles . . . meeting all requirements for drawing quality and finish.

For the '57 grille the "specs" call for slit-edge coils, over 12" in width, .036" thick, No. 4 temper, DSC *RBF* bright finish suitable for chrome plating. As each blank weighs over five pounds, the requirements run to millions of pounds.

AS A MANUFACTURING MAN—We believe you would appreciate the workmanship and appearance of these grilles . . . how each half section, right and left, is drawn in one "shot" to make the frame, the lattice-work grid (of continuous-channel design), and the recesses for the turn signals. The sections are then chrome plated and assembled.

Simple? Yes . . . when the gauge is tight, the temper right and the finish "deep-rolled" bright for mass-production plating . . . PLUS the die-making and production skills of the Ford vendors. *

AS A VALUE-WISE BUYER—Wouldn't you say that a case history like this one shows (1) that DSC *RBF* STRIP is *profitable* to the users; (2) that it keeps their over-all job-costs *competitive;* (3) that DSC SERVICE helps two major vendors meet Ford standards for product quality and for closely-timed production and shipping schedules?

There may be profit possibilities in your own use of DSC RBF "deep-rolled" STRIP . . . or other DSC PRODUCTS and SERVICES. For complete information check with your nearest DSC Customer "Rep." You'll get immediate action on your inquiry.

**DSC MILLS AND PRODUCTS*

DSC General Office will supply the names if requested on your company letterhead

PORTSMOUTH DIVISION, PORTSMOUTH, O.

Coke • Coal Chemicals • Pig Iron
Basic OH Steel Ingots • Blooms • Slabs • Billets • Rods
Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon
Manufacturers' Wire • High Carbon Specialty Wire • Aluminum Cable Steel Strand
Reinforcement • Rope Wire • Tire Bead Wire • Welded Wire Fabric

MILL DIVISION: DETROIT, MICH., HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

AMERICA AND STEEL MUST GROW TOGETHER
STEEL CENTENNIAL
1857 1957

DETROIT DSC STEEL

Customer Satisfaction Is Our Business

DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

CUSTOMER "REP" OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio., Dayton, Ohio., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., Milwaukee, Wis., New York, St. Louis, Toledo, Worcester, Mass.

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Plan for Long Range

We are receiving more and more comments and inquiries which demonstrate the need for better long range planning. These are typical:

A steel company finds its markets restricted because of changing customer requirements and the limited range of products it can make.

A maker of power transmission equipment is unable to reverse the downtrend in the sales of the standard item he has been making for many years.

A job stamping outfit has presses so outdated it can no longer compete for choice auto part contracts.

A textile machinery maker has dwindling sales and idle plant capacity.

A home appliance manufacturer finds the going rough in competition with the bigger companies.

We suspect that the executives guiding the destinies of those companies—and many like them—are immersed in day-to-day problems of production, sales and the monthly balance sheet.

Unlike their more aggressive brethren, they have not taken enough time out to sit back and view the broader picture objectively.

They should find time for questions like these:

In the next 5, 10, 20 years, will our present products have a market? If not, what should we be making? How will we handle sales and distribution? What will be the volume of business? What profit can we reasonably expect to make?

Pat answers can't be offered, but we advise you to weigh these forces in your thinking:

1. Our population (it's 170 million today) is growing at the rate of 250,000 a month.

2. We are evolving an entirely new concept of living: More people. More income. More leisure to enjoy more things.

3. Our population is growing faster than our work force, so we'll have a continuing shortage of skilled labor.

4. Our annual investment of $5 billion in research and development is bringing technology along so fast that what was blue sky yesterday is routine today.

We come to this conclusion: You should be forewarned by companies having troubles now. The problem is urgent. The thinking and planning you can (and must) do today will shape the long range future of your company.

Irwin H. Such
EDITOR-IN-CHIEF

A Multipress case study

Multipress, used here for staking chromium-plated pepper mill lids, saves 11¢ per unit for specialty manufacturer.

MULTIPRESS saves specialty manufacturer 11¢ per unit

By using a Denison hydraulic Multipress equipped with simple interchangeable tooling, The George S. Thompson Corporation, South Pasadena, California, manufacturer of the Olde Thompson line of pepper mills and gourmet accessories, is now saving 11¢ on each pepper mill produced.

Previous methods for three sub-assembly operations cost the company 15¢ per unit. With the hydraulic Multipress, costs for these three operations have been reduced to 4¢ per unit. In addition to this significant cash savings, rejects have been virtually eliminated and production has been substantially increased

The interchangeable fixtures on the index table permit the Multipress to be used for short-run jobs. Downtime for change-over is eliminated.

Learn how Multipress can reduce your production costs. Write Denison Engineering Division, American Brake Shoe Co., 1180 Dublin Road, Columbus 16, Ohio.

Write for Datalog ASY-5 describing this money-saving method.

DENISON HydrOILics

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

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Here are some of reasons why . . .

Leisure Means Expanding Markets

1. Working hours per week are getting shorter.
2. Modern home conveniences are giving the women more free time.
3. Rising standard of living means more money is spent for luxury items.
4. Participative sports are gaining popularity over spectator sports.
5. Teen-age and retired population is increasing.

Leisure: Market for Metals

Americans will spend nearly $20 billion annually on recreation by 1962, compared with $14.3 billion in 1956. Can you share in making equipment for that market?

PRESIDENT Eisenhower is generally regarded as a major influence in the nation's golfing boom. (Manufacturers' sales of clubs jumped from $14.7 million in 1947 to about $29.5 million last year.) But Mr. and Mrs. John Q. Public are the biggest wheels in the leisure market. (For example, they spent $217 million on outboard motors last year, versus $78 million in 1947.)

Government census figures indicate Americans spend about 5 per cent of their disposable income on recreation (about $14.3 billion) in 1956. Included in the recreation classification are books, magazines, newspapers, durable and nondurable toys, sporting equipment, radios, television sets and records.

Here's Why — Metalworking's stake in the leisure market is big. Since 1950, the largest increases in the government's breakdown have been in the durable goods categories. The trend is for a continued upswing. Here are some of the major factors at work:

1. People have more leisure. The breadwinner is working shorter hours and has the promise of an even shorter work week within ten years. His wife has more free time from household chores.

2. Our rising standard of living is giving us more money to spend for items other than necessities.

3. With the shift of the population to suburbia, home and family are becoming the center of leisure activities.

4. More emphasis is being put on participative sports and activities. Bowling, golfing and boating have made giant strides at the expense of spectator sports, particularly baseball.

5. The teen-age and retired population is increasing. Both groups are considered important because they have more leisure than the average working adult.

Metalworking's Share—Those already in the market are expanding to keep pace with its growth. Outboard Marine Corp., Waukegan, Ill., has a $20-million dollar expansion program under way. Its Evinrude Motors Division, Milwaukee, moved this spring into a new $4-million plant which boasts one of the country's most modern automated foundries.

"The outboard boating industry has moved into the blue chip field," says Howard F. Larson, Evinrude's director of sales and marketing. "This year, Americans will spend close to $1 billion on the sport. Our statistics indicate that each outboard motor sale by our dealers results in an additional sale of $625 for other equipment and accessories."

A bigger slice of the outboard boat business is going to metalworkers, too. Aluminum (see STEEL, June 17, p. 58) has made the biggest inroads—the Outboard Boating Club of America estimates that about 45 per cent of the boats made today are aluminum. Plastics, a newcomer, has about 10 per cent of the market. Wood has the

Future Competition for the Sports Car?

New products offer the creative metalworker a big opportunity in the leisure time market. Above is Hiller Helicopters' conception of an aerial sedan which promises competition for sports cars. Using the principle of the ducted fan, the aerial sedan is more than just an idea. Hiller has already built the experimental Flying Platform for the Navy to prove out certain theories; basic engineering for the above craft is complete. Another development of the firm is the one-man helicopter. You will be able to buy them in about ten years, Hiller officials estimate.

remainder. Color appeal in boats and motors is just emerging—anodized aluminum boats are expected to make a big sales splash.

Financial Assist — Another big factor, particularly where higher priced items are concerned, is installment buying. The outboard boat and motor industry is promoting this to advantage—investment in a boat, motor, trailer and accessories averages $1000. Many in the auto and appliance industries admit privately that they're probably losing sales to this market because installment purchases are possible.

Do You Fit?—If you're looking for a way to diversify, the leisure market has potential. One appliance maker is seriously considering the boat field—it feels its press facilities are a natural. Another favorable factor: Boat building has an economic cycle that's different from that of appliances. Production cycles would mesh advantageously.

In Automotive Products—Watch auto makers for increasing activity in sports cars—generally considered part of the leisure market. The increase in foreign car sales is stirring part of the action. It's difficult to tell where the influence begins and ends in the demand for a sports car or an economical "second car."

Of the domestic sports cars, Ford's Thunderbird has had the most success, even though Chevrolet's Corvette was the first on the market. Auto makers are also checking the sales potential of the four-passenger sports-type car. The Studebaker Hawk and Plymouth Fury are examples. Rumor has it that Pontiac and perhaps Buick will offer similar models this fall.

In Lines for Suburbia — New products also provide a potential for metalworkers looking at this leisure market. The influence of the move to suburbia and the housing boom are showing up. Sales of metal porch, lawn and outdoor furniture ($17.7 million in 1947, versus $55 million in 1954) are examples.

This influence is also demonstrated in the tremendous increase in private swimming pools. Industry sources report that the nation had 57,000 residential swimming pools on Jan. 1, 1957, compared with 2500 at the beginning of 1948. They range from $500 aboveground plastic jobs to the $13,000 steel luxury models that U.S. Steel's American Bridge Division builds. Most of American Bridge's pools are going to private clubs, resorts and colleges, but several other steel pool builders aim directly at the residential market with installations costing about $5000.

Pool accessories are big business. The National Swimming Pool Institute reports that of the 33,000 pools (all types) built last year 98.6 per cent had filters, 97 per cent included underwater lights and ladders, 82 per cent had diving boards, 31 per cent water heaters.

"What's really needed," says a member of the specialty sporting goods industry, "is an outdoor game to replace croquet—something new and modern that the whole family can participate in, sort of an outdoor Canasta."

Pick Your Role — Maybe your bid for a share of the growing leisure market will be something out of today's science fiction like the flying fan that Hiller Helicopters has on the drawing boards (see picture).

Take a look at the market—it's a growing one. By 1962, Americans will be spending nearly $20 billion annually for those items which the government census lists under recreation.

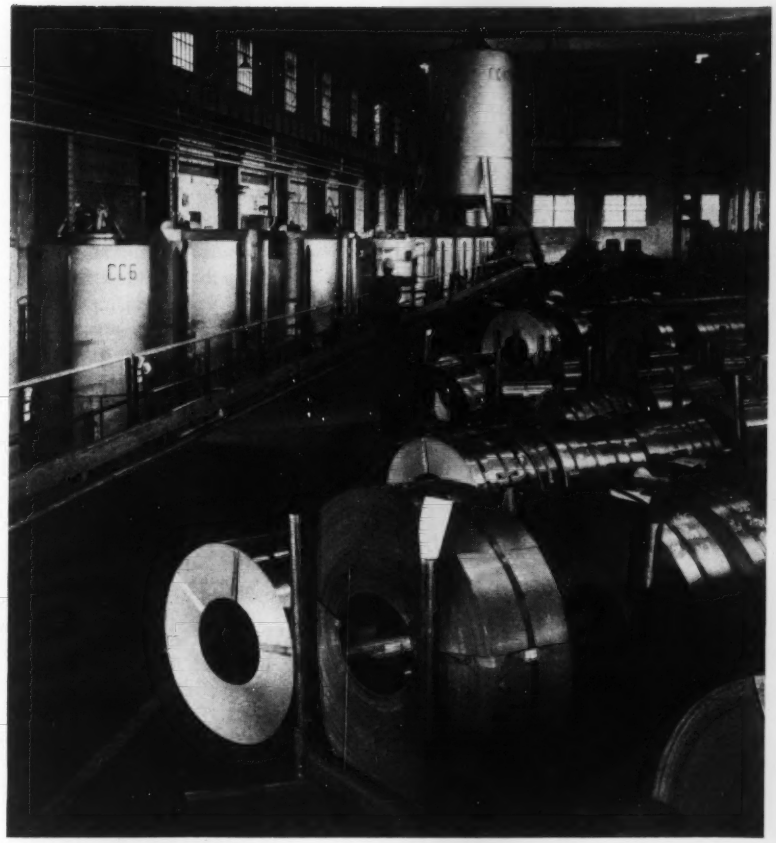
South's Heat Pump Sales To Rise

By year end, look for heat pumps to sell four or five times faster in the South than they do now, predicts Westinghouse Electric Corp.

"One reason for this is the development of a two-package unit which can be used in bungalows without basements," says B. D. Henderson, vice president and general manager of the firm's Staunton, Va., air conditioning plant.

Westinghouse has a new pump which consists of an outdoor reversible cycle and an indoor blower coil unit occupying about one-fourth the inside space previously required.

Prices are expected to be comparable to those of combustion-fired heating and cooling systems. The suggested price for an average installation is $1400.



Annealing installation like this at Riverdale is one way . . .

Acme Gains Self-Sufficiency

ACME STEEL CO. has taken the second step in its semi-integration program. On July 22, the company broke ground for its $23-million cupola-oxygen converter steelmaking plant in Riverdale, Ill. Construction is scheduled for completion in 18 months.

The first step was the acquisition of Newport Steel Corp., Newport, Ky., from Merritt-Chapman-Scott Corp. for $16.45 million. Since late September, when Acme began operating that company as a subsidiary (Acme-Newport Steel Co.), it has been barging about 10 per cent of its semifinished steel requirements to Riverdale.

Filling a Need—Chairman Frederick M. Gillies explains: "It became obvious some years ago that our normal growth was exceeding our ability to procure adequate supplies of raw materials at reasonable prices. Opportunity for better profits in times of high demand was denied us. By integrating operations to make enough steel for our requirements cheaper than we can currently buy it, we're entering an important era."

At Riverdale, the firm makes hot and cold-rolled strip, hot-dipped and electrogalvanized strip. Acme-Newport makes hot-rolled sheets and plates, galvanized sheets, electrical sheets, electricwelded pipe and mechanical tubing.

Meeting a Demand—Ingot capacity of Acme-Newport is 608,000 tons annually, of which 325,000 tons is open hearth and 283,000 tons is electric furnace. Melting equipment includes seven open hearths—five of 97-ton and two of 78-ton capacity—and three electric furnaces of 75-ton capacity.

Changing a Process—With its new Riverdale plant, the 77-year-old firm will introduce a different steelmaking process to the U.S.—the combination of hot blast cupolas and oxygen blown converters. Annual plant capacity initially will be 450,000 tons.

Adding Facilities—Equipment includes two 25-ton hot-blast cupolas, two 200-ton forehearths, two 50-ton oxygen converters, three 4-hole batteries of soaking pits, a blooming mill and a 3-stand rolling mill. The cupolas will produce 1200 tons per day. The contemplated charge is 30 per cent pig iron and 70 per cent steel scrap. The converters can change 50 tons of iron to steel in about 35 minutes. A planned air separation plant will produce 110 tons of oxygen daily.

Building a Supply—The new Riverdale facility will supply 70 per cent of Acme Steel's needs for billets and blooms. The company will approach self-sufficiency in steel supply. Capacity at Riverdale could be raised to 600,000 tons yearly by installing a third cupola.

Expanding a Market—With operation of the oxygen converter plant by 1959, barging of billets and slabs to Riverdale will be reduced or eliminated. Acme Steel is beginning to expand Acme-Newport's market for its own products.

First move is for Acme-Newport to produce steel strapping. To this end, slitting, heat treating and painting equipment is to be installed. This will make it easier for the parent company to serve its strapping customers in the South and Southeast.

Shaping the Structure—Facilities for making electricweld pipe at Acme-Newport also are being expanded. Two electric steelmaking furnaces already are top charge and the third will be converted; all will have their power upped.

Sales staffs and sales offices of Acme Steel and Acme-Newport have been merged where feasible. Complete consolidation is not desired because of product variety of the two divisions.

'57: Industrial Rubber's Year

A sales record of $1.2 billion is in sight. Even higher levels lie ahead if the air spring catches on. Its merits are debated, but rubber companies get set to make it in volume

"THE BEST year in the history of the industrial rubber goods industry," is the way spokesmen for three of the largest producers describe 1957.

Estimated sales this year: $1.2 billion, a 3 per cent rise from 1956, which was a record year.

Controversy—The air spring, (STEEL, Jan. 14, p. 69) described as the industry's "most dramatic new product in years," has engineers, designers and production men divided.

Proponents say it will revolutionize spring systems on all vehicles, including automobiles, and will ultimately provide a greater dollar sales volume than tires.

Opponents say that it is too costly to ever be anything but a luxury item; that it is not nearly as foolproof as proponents claim; that maintenance and replacement will come high.

In any event, the "big four" of the rubber industry have cleared their decks to produce the air spring even though many overlapping patents have been filed, and the whole patent picture is unclear.

Many Uses—P. P. Crisp, president, Firestone Industrial Products Co., Akron, points out that the new suspension device can be used for many things other than absorbing shocks on vehicles. Says Mr. Crisp:

"One company was having trouble grinding paper mill rolls and steel mill rolls. Vibrations spoiled tolerances. With the air spring, all outside vibrations were eliminated.

"Technicians performing a new heart examination technique, which requires that the patient be absolutely motionless, had difficulty because of vibrations from trucks passing outside. The air spring got rid of the vibrations.

"Outside building vibrations come through solid rubber but not through air. Air pressure in the air spring can be changed so that any shock or motion can be tuned out."

Constant Development — New applications for products turn up every day, such as the extended use of wire braid hose in hydraulics and power steering on automobiles.

"Every molded, extruded product is a new product for a particular customer," says R. B. Warren, general manager, industrial products division, Goodyear Tire & Rubber Co., Akron.

Mr. Crisp points out that 75 per cent of his firm's business is "engineered, specialized products, frequently new."

Says Dr. E. W. Bender, assistant development manager, mechanical goods division, U.S. Rubber Co., New York:

"The drive for efficiency in steel and metal finishing has put more stringent quality and performance requirements on mechanical rubber equipment. We are asked to develop products with more chemical resistance, more resistance to elevated temperatures, more abrasion resistance and more ability to take higher operating speeds."

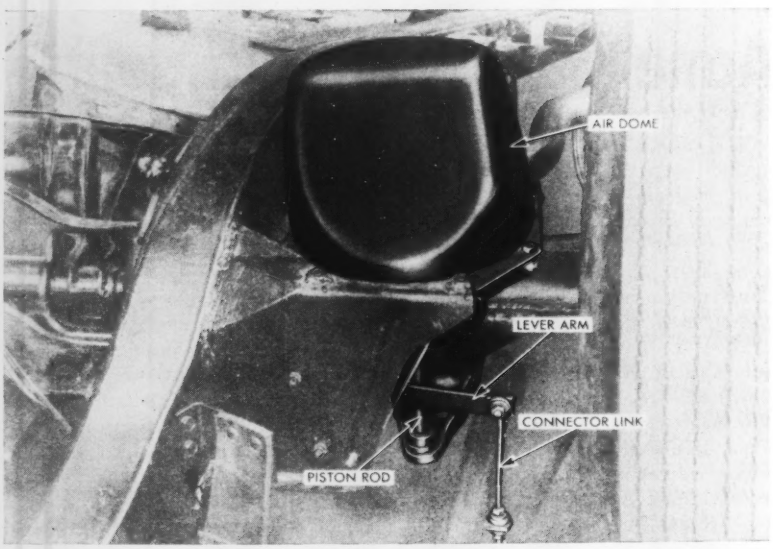
Front Runners—Industrial hose, belts and V-belts, molded and extruded items, printers' supplies, packing, matting sheet stocks and flats provide the largest sales volume throughout the industry. Much of the production goes to the automotive industry.

G. A. Lovell, vice president and general manager of U.S. Rubber's mechanical goods division, is optimistic. He says:

"I feel there will be an increase of approximately 8 per cent in sales of our mechanical rubber products to the metal and metal finishing industries in 1957. This prediction is based on the growth of these industries and the step up of their use of mechanical rubber products."

Mr. Crisp expects Firestone to increase about the same. Mr. Warren says Goodyear's prospects "are bright."

Other Side of Coin—There are some problems. Competition is



The air spring shown here is the type used on Cadillac's Eldorado brougham. The assembly has a steel dome with a rubber diaphragm bonded to the bottom. A piston moves against the diaphragm, which causes air pressure to absorb the shock

"fierce" in the industrial rubber goods industry. This makes the price picture tight, despite rising labor and material costs. But the Goodyear-United Rubber Workers pattern-setting pact negotiated last week calls for a 6 per cent wage hike—almost certain to result in higher prices before long.

"The industry has too much capacity and is overproducing," feels one executive. "Everyone wants to operate at full capacity. It is becoming difficult to keep competitive and legal at the same time because we can't set up different price levels."

There has been no basic price increase since 1953, but industry spokesmen are cautious about the immediate future. Most agree with Mr. Warren that any union boosts or freight rate increases will be felt in the price structure.

New Products—Goodyear is subjecting its rubber-on-steel railroad crossing which is silent and shockproof to exhaustive tests. It also has a rubber truck dock fender.

U.S. Rubber has a power grip "timing belt," a rubber, fabric and steel transmission belt with teeth in a grooved pulley that give nonslip, silent power transmission.

B. F. Goodrich Co., Akron, has encased a tire in a steel shell and vulcanized it with atomic energy; has a bonding material which eliminates rivets from airframes; and a "torsilastic" rubber spring with a self-leveling device for busses and trucks.

Fast Tax Clearance Given 11

Eleven companies have been added to the list of those allowed fast tax amortization by the Office of Defense Mobilization. Seven were issued for defense or AEC production; three were for research and development; one was issued under the steel castings goal.

These companies were included (figures in parentheses indicate the percentage of total cost which was allowed): Ramo-Woolridge Corp., Los Angeles, $13,418,872 (40), for research and development; Aluminum Co. of America, Vernon, Calif., $4,323,000 (65), for aluminum extrusion facilities for military aircraft; and General Electric Co., Evendale, O., $3,909,950 (80), for military aircraft engines.

Designed for quick die changes, Danly's press can help in . . .

Reducing Stamping Costs

IF DIE CHANGING TIME is running up your stamping costs, take a look at the new press designed by Danly Machine Specialties Inc., Chicago.

Key to the design is the use of two bolster plates mounted on separate carriers. Die changing which can take a conventional press out of production for as long as 8 hours is done in 5 or 6 minutes.

How It's Done—Uprights have openings large enough to permit the die carrier and dies to move through the end of the press at right angles to the production flow.

"This has two advantages," explains James C. Danly, vice president-engineering. "1. While the press is in operation with one set of dies on one carrier, another set of dies can be located and bolted on the bolster of the other carrier. 2. Since the dies are changed at right angles to the production flow, it is unnecessary to remove any mechanical handling equipment between presses in a production line. This feature also permits presses to be placed closer together because dies are not loaded through the front of the press."

Die carriers move on rails extending from both sides of the press. They are chain driven and individually controlled from the master panel. When the carrier moves into position against positive stops on the press, the wheels are located over hydraulic cylinders which retract and position the carrier over keys to rest solidly on the press bed.

Securing Upper Dies—Adapter plates are provided with each die carrier and are fastened to the upper half of the dies in the die loading position. After the carrier is bolted down to the press bed, the press slide is adjusted at its stroke-down position so that it almost touches the adapter plate.

Once a die's shut height is known, the slide can be automatically adjusted by dialing the shut height on a slide positioner.

Concentration: What's the Score For Metalworking?

THE accompanying figures reveal the kind of thinking that has gone into the preparation of a case against industrial concentration. This selected information on metalworking is from Sen. Estes Kefauver's (Dem., Tenn.) study of "Concentration in American Industry," which was prepared by the staff of the Senate Anti-trust & Monopoly subcommittee.

Don't read the statistics as if they were Gospel. The Bureau of the Census issued a 109-page report on the subcommittee's 756-page study, warning that statistics such as these can be misleading.

STEEL prints these excerpts, not as an answer to the concentration question, but to show you what all the fuss in Washington is about.

Fallacies in Study—The U.S. Chamber of Commerce, while neither agreeing nor disagreeing with Senators Kefauver, Joseph O'Mahoney (Dem., Wyo.) and others on Capitol Hill who claim the report "shows a remarkable increase in the concentration of manufacturing," outlines nine fallacies in the subcommittee's methods:

1. Census bureau classes of industry can be misleading by being either too broad or too narrow.

2. Multiproduct plants are not represented.

3. Captive production is ignored.

4. Multiplant operations are weighted to the disadvantage of single plant firms.

5. Many products with separate listings actually compete with each other.

6. Competition with used and scrap products is ignored.

7. Exports are not considered.

8. Nor are imports.

9. Two years (1947 and 1954) don't establish a trend.

Conclusion—Only a few metalworking industries containing a large number of plants seem to be experiencing any growth in concentration on the basis of the census figures. Many appear to be going in the opposite direction.

Final thought: How many firms which have increased their share of the market are simply doing it through better management techniques?

PERCENTAGE OF INDUSTRY SHIPMENTS ACCOUNTED FOR BY	1954	1947
PRIMARY METALS		
Steelworks & rolling mills ('54—102 firms; '47—111)		
Four largest companies	54	45
Eight " "	70	63
Twenty " "	85	81
Gray iron foundries ('54—1321 firms; '47—1554)		
Four largest companies	26	16
Eight " "	34	24
Twenty " "	46	35
Malleable iron foundries ('54—71 firms; '47—68)		
Four largest companies	50	35
Eight " "	59	48
Twenty " "	76	69
Steel foundries ('54—207 firms; '47—177)		
Four largest companies	21	23
Eight " "	34	36
Twenty " "	53	57
Copper rolling & drawing ('54—64 firms; '47—56)		
Four largest companies	53	60
Eight " "	71	77
Twenty " "	90	92
Aluminum rolling & drawing ('54—77 firms; '47—15)		
Four largest companies	88	94
Eight " "	92	99
Twenty " "	96	100
Nonferrous foundries ('54—1863 firms; '47—1675)		
Four largest companies	22	26
Eight " "	30	34
Twenty " "	41	44
Iron & steel forgings ('54—247 firms; '47—240)		
Four largest companies	27	24
Eight " "	38	35
Twenty " "	59	54
Wire drawing ('54—150 firms; '47—103)		
Four largest companies	36	45
Eight " "	54	62
Twenty " "	74	82
FABRICATED METAL PRODUCTS		
Edge tools ('54—244 firms; '47—231)		
Four largest companies	25	27
Eight " "	40	41
Twenty " "	61	61
Plumbing fixtures & fittings ('54—307 firms; '47—263)		
Four largest companies	36	35
Eight " "	52	48
Twenty " "	72	68
Structural & ornamental work ('54—2829 firms; '47—1600)		
Four largest companies	18	23
Eight " "	23	27
Twenty " "	31	37
Boiler shop products ('54—934 firms; '47—783)		
Four largest companies	30	18
Eight " "	40	29
Twenty " "	55	44
Sheet metal work ('54—2363 firms; '47—1665)		
Four largest companies	19	21
Eight " "	28	29
Twenty " "	36	38
Metal stampings ('54—2215 firms; '47—1954)		
Four largest companies	14	17
Eight " "	21	25
Twenty " "	33	37
Enameling & lacquering ('54—377 firms; '47—260)		
Four largest companies	14	23
Eight " "	23	25
Twenty " "	39	50

PERCENTAGE OF INDUSTRY SHIPMENTS ACCOUNTED FOR BY	1954	1947
Galvanizing		
('54—132 firms; '47—121)		
Four largest companies	23	33
Eight " "	37	46
Twenty " "	59	66
Plating & polishing		
('54—2423 firms; '47—1789)		
Four largest companies	10	15
Eight " "	13	20
Twenty " "	20	28
Bolts, nuts, washers & rivets		
('54—421 firms; '47—339)		
Four largest companies	15	20
Eight " "	25	31
Twenty " "	45	52
Screw machine products		
('54—1791 firms; '47—1205)		
Four largest companies	11	17
Eight " "	15	20
Twenty " "	23	29

MACHINERY (except electrical)

Farm machinery (except tractors)		
('54—1145 firms; '47—955)		
Four largest companies	38	36
Eight " "	51	47
Twenty " "	64	58
Construction & mining machinery		
('54—589 firms; '47—489)		
Four largest companies	19	18
Eight " "	29	31
Twenty " "	50	50
Oil field machinery & tools		
('54—319 firms; '47—204)		
Four largest companies	35	33
Eight " "	48	47
Twenty " "	67	69
Machine tools		
('54—627 firms; '47—312)		
Four largest companies	19	20
Eight " "	29	30
Twenty " "	52	50
Metalworking machinery		
('54—475 firms; '47—405)		
Four largest companies	22	23
Eight " "	35	35
Twenty " "	58	58
Textile machinery		
('54—517 firms; '47—470)		
Four largest companies	32	30
Eight " "	46	44
Twenty " "	63	59
Pumps & compressors		
('54—463 firms; '47—425)		
Four largest companies	28	29
Eight " "	40	39
Twenty " "	58	56
Conveyors		
('54—374 firms; '47—243)		
Four largest companies	23	29
Eight " "	35	39
Twenty " "	55	64
Blowers & fans		
('54—208 firms; '47—187)		
Four largest companies	31	39
Eight " "	49	54
Twenty " "	68	72
Industrial trucks & tractors		
('54—234 firms; '47—191)		
Four largest companies	50	57
Eight " "	62	69
Twenty " "	77	81
Industrial furnaces & ovens		
('54—164 firms; '47—105)		
Four largest companies	34	31
Eight " "	51	48
Twenty " "	74	76
Domestic laundry equipment		
('54—48 firms; '47—59)		
Four largest companies	68	40
Eight " "	85	65
Twenty " "	99	91

PERCENTAGE OF INDUSTRY SHIPMENTS ACCOUNTED FOR BY	1954	1947
Valves & fittings (except plumbing)		
('54—523 firms; '47—436)		
Four largest companies	17	24
Eight " "	27	32
Twenty " "	47	50
Fabricated pipe & fittings		
('54—237 firms; '47—206)		
Four largest companies	27	22
Eight " "	42	36
Twenty " "	62	59
Ball & roller bearings		
('54—83 firms; '47—78)		
Four largest companies	60	62
Eight " "	79	79
Twenty " "	92	93

ELECTRICAL MACHINERY

Motors & generators		
('54—266 firms; '47—224)		
Four largest companies	50	59
Eight " "	59	66
Twenty " "	75	80
Electrical welding apparatus		
('54—111 firms; '47—103)		
Four largest companies	39	46
Eight " "	52	58
Twenty " "	76	79
Electrical appliances		
('54—348 firms; '47—310)		
Four largest companies	50	36
Eight " "	61	47
Twenty " "	79	70
Radios & related products		
('54—1612 firms; '47—799)		
Four largest companies	24	26
Eight " "	35	35
Twenty " "	53	54

TRANSPORTATION EQUIPMENT

Truck & bus bodies		
('54—555 firms; '47—599)		
Four largest companies	18	22
Eight " "	27	31
Twenty " "	45	48
Truck trailers		
('54—115 firms; '47—107)		
Four largest companies	57	56
Eight " "	68	67
Twenty " "	84	83
Automobile trailers		
('54—267 firms; '47—214)		
Four largest companies	19	17
Eight " "	28	30
Twenty " "	45	55
Motor vehicles & parts		
('54—991 firms; '47—779)		
Four largest companies	75	56
Eight " "	80	64
Twenty " "	87	78
Aircraft		
('54—46 firms; '47—47)		
Four largest companies	47	53
Eight " "	76	75
Twenty " "	96	97
Shipbuilding & repairing		
('54—328 firms; '47—272)		
Four largest companies	43	43
Eight " "	58	55
Twenty " "	74	73
Railroad & street cars		
('54—47 firms; '47—68)		
Four largest companies	64	56
Eight " "	81	72
Twenty " "	98	92
Motorcycles & bicycles		
('54—44 firms; '47—75)		
Four largest companies	50	42
Eight " "	77	68
Twenty " "	97	92

Source: Senate Antitrust & Monopoly Subcommittee, whose figures were prepared by the Bureau of the Census.

Uncle Sam's Tools Put on Block

BY-PRODUCT of new Defense department policy to build missiles faster and economize: More U.S.-owned machine tools will be sold in the year ahead than had been anticipated by distributors and used machine tool dealers. Be prepared, says one Washington source, for 25,000 tools to be put on the block in the next 12 months. Only about 7000 have been sold in the last 30 months. Under the heading of denied rumors: The Air Force alone will peddle 10,000 tools.

Also in the wind: A Defense proposal that it be given the right to sell industrial facilities, complete with tools, without advertising (STEEL, June 17, p. 60). Other government agencies interested in machine tools continue to fight it as a gimmick which might open the floodgates to wholesale dumping. Agency spokesmen believe Defense could declare almost anything surplus under the proposed legislation, including packages of tools and stand-by lines, because they might be termed "facilities."

Tool Census Is Coming In

The Army has over 80,000 machine tools under its jurisdiction, according to a new count. A Navy count is due shortly; the AF is lagging. Government machine tool experts have boosted their estimates of U.S.-owned tools to about 350,000. They're based on the Army figures.

The majority are about seven years old. Each ton of tools costs the government $35 a year for storage and maintenance. So economy rules the disposal of those not needed. The effect on the market, especially on used dealers, concerns Washington.

The Business & Defense Services Administration is doing its best to check proposed sales by Defense. An inspection team this week goes to Chicago's O'Hare Field to look over 1002 tools the AF wants to sell. Back at the Office of Defense Mobilization (the agency which has final authority over disposal), requests to sell tools by the AF, Army and Navy are piling up.

Republicans Walk Fiscal Tightrope

Administration economists privately do not rule out the possibility of a recession in 1958. Indeed, it seems possible that President Eisenhower may have put the future of the Republican party on the block with a decision to hold government spending in fiscal 1958 to the fiscal 1957 level. Voters won't remember economy as long as they will unemployment.

But the administration may feel that a slight recession in 1958, primarily caused by tight credit and defense cutbacks, is preferable to continued inflation. By 1960, the kinks in the economy may have worked themselves out, so that the big boom will be back for election time.

In Either Case: Democrats Gain

Such a recession would by no means affect the whole economy. In the main, it would operate in areas already affected: Housing and aircraft, to name two. The tightrope for the Republicans: Either way they jump (inflation or deflation), the Democrats will be there to pick up the pieces.

Around Washington, dopesters figure the new policy is already in effect with the President's decision to not allow lower down payments on FHA home loans, even though Congress authorized him to do so. Builder William Levitt has predicted that without the aid of reduced down payments housing starts will drop to 700,000 in 1958.

Finally, the Treasury has finished up fiscal 1957 with a surplus of $1.6 billion. But, as soon as that was announced, the President went on record against a tax cut next year. Look for this policy of deflating the boom to show up in other government decisions the rest of the year:

1. Tight money will get tighter.
2. Defense cutbacks will pick up.
3. The administration will offer little relief to the minerals industries.

School Bill Bites Dust

Like the bill to make the Small Business Administration a permanent agency, federal aid for school construction can be written off as a casualty of the civil rights debate. House passage of the bill will have no bearing on possible Senate action, because that body plans to go home on recess as soon as some civil rights action is taken and a few "must" bills like foreign aid are passed.

Don't be surprised if school aid is quietly dropped from the administration's program for next year. Statistics on the room shortage are contradictory and the administration doesn't want to give Congress an excuse to stir up another economy drive next year.

Capitol Notes

The U.S. part of the St. Lawrence Seaway is about 54 per cent completed. . . Government contracts set aside for small business in fiscal 1957 increased $247 million over 1956's setasides. . . Senate Finance Committee rushed into the lead-zinc tariff fray last week by starting hearings before the House Ways & Means Committee begins its own on Aug. 1 (all tariff measures must originate in the House group).

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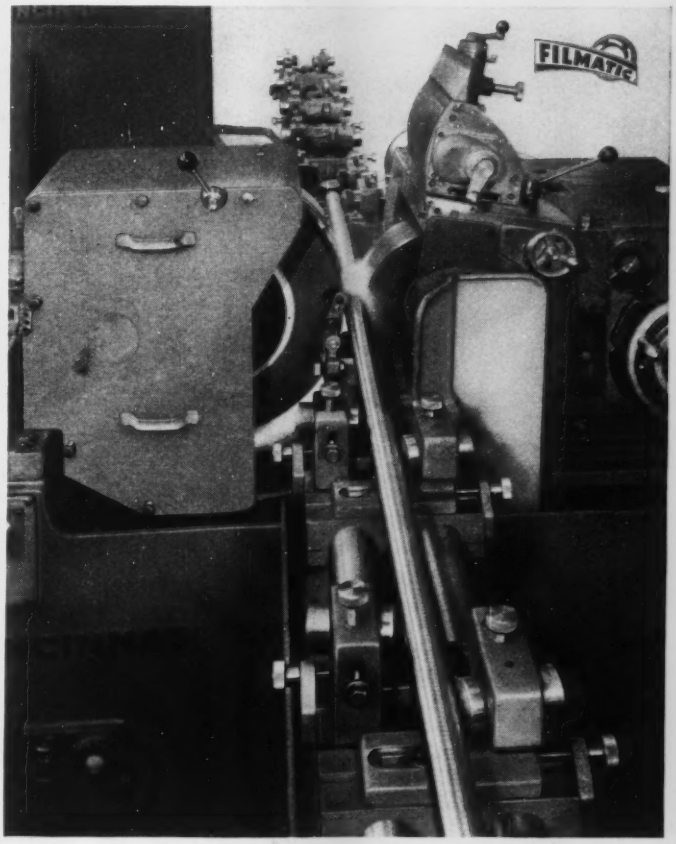

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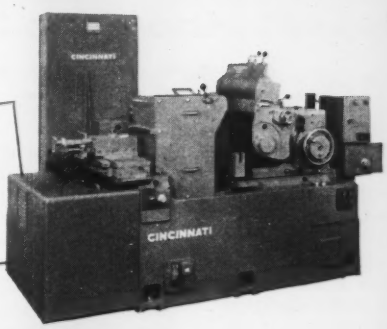

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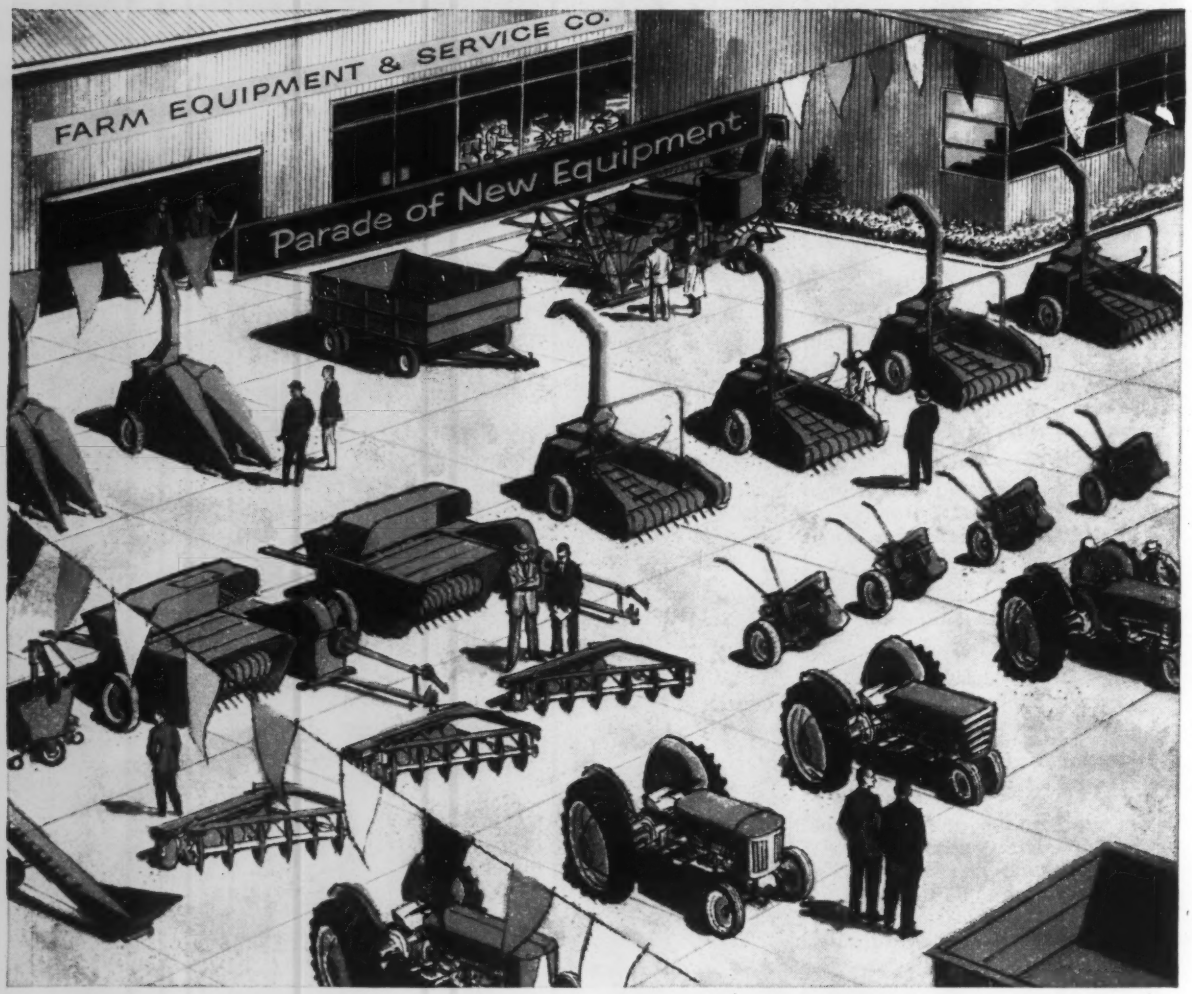

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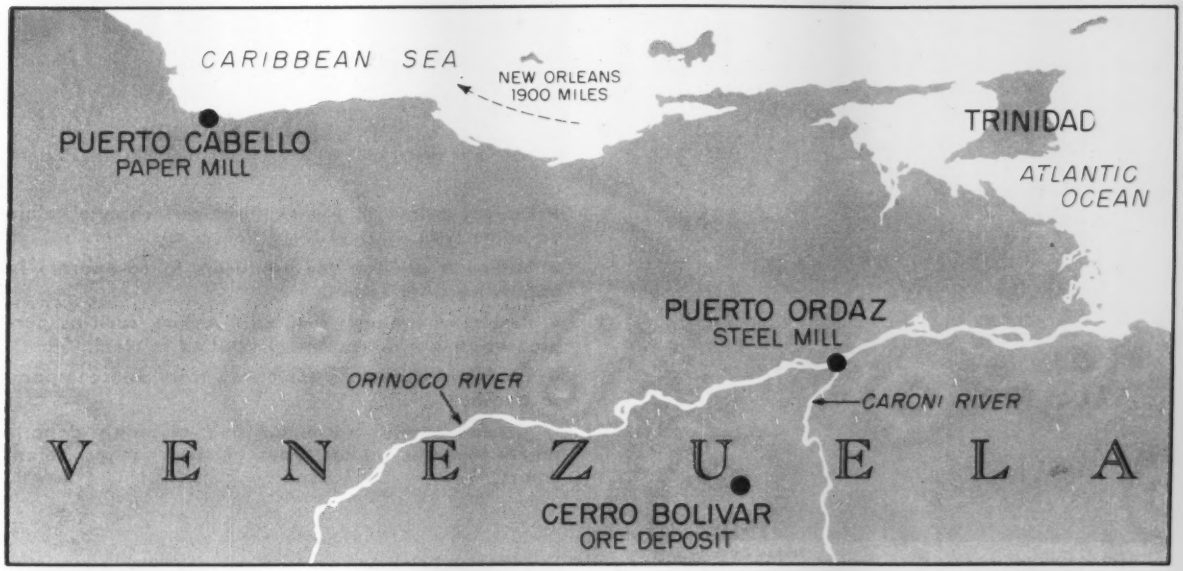


Venezuela Builds Huge Mill

$343 million integrated iron and steel plant on Orinoco river will be in production by 1960. New paper mill is also planned in country's industrialization

VENEZUELA is taking a huge step toward industrialization with its $343-million integrated iron and steel project on the Orinoco river near Puerto Ordaz. Scheduled for completion in 1960, the installation will have an ultimate annual capacity of 1.3 million net tons of steel ingots.

International—The project will be owned and operated by the Venezuelan government; industrial know-how of several countries is going into its construction.

U.S. manufacturers will produce most of the equipment, but some will come from Italy, Norway and Germany. Innocenti S. G., Milan, Italy, is the prime contractor in charge of construction. Ramseyer & Miller Inc., New York, is the consultant for over-all inspection and control work.

Linked with the Cerro Bolivar iron ore deposits, the plant will consume 1.1 million tons of ore annually. Other locally produced raw materials will include coal (428,000 tons annually) and limestone (218,000 tons annually) and scrap (264,000 tons annually).

Electric—Low-shaft electric pig iron smelting furnaces will be used, so that the plant can rely almost entirely on nearby raw materials. Power will be furnished by a government hydroelectric project being constructed on the Caroni river which joins the Orinoco.

Nine 220-ton capacity electric resistance units will be installed. Four 305-ton open hearth furnaces will produce steel ingots. A seamless pipe mill is expected to be in production next year. It'll use imported billets until the plant can produce its own.

Other products: Rails, reinforcing rods, deformed bars, flat products, light and heavy structural shapes and wire products.

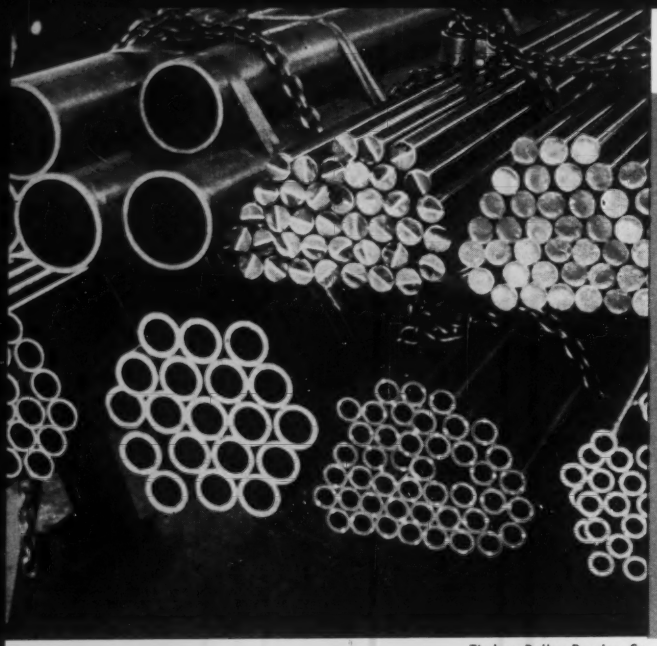
A floating pier has been built at the site on the Orinoco to accommodate the 44-ft range between high and low water. A permanent pier, designed to meet the changes in the water level, is under construction. It will be 1378 ft long.

Housing and municipal facilities for a city of 15,000 are under construction. About 5000 workers are required to construct the plant which will employ 8000.

Other Expansion — At Puerto Cabello, 500 miles northwest of the steel plant site, a group of Caracas businessmen is financing construction of a paper mill. Incorporated under the name of Venepal, the group has received a $3.5-million credit from the Export-Import Bank for the purchase of U.S. machinery and equipment.

Most of the money will be used to buy electric generating equipment from the Worthington Corp., Harrison, N. J.; electrical distributing equipment, from Westinghouse International, New York; water treatment plant, from Dorr-Oliver Inc., Stamford, Conn.; cranes, from Harnischfeger Corp., Milwaukee; and machine tools, from Sabin St. Germain, New York.

U.S. consulting engineers and technicians will install the mill and place it in operation.



Timken Roller Bearing Co.

Lack of a Standardized Color Coding System:

- Causes delays in plants. Producers change colors on same type of steel for different customers.
- Makes it difficult for producers to co-operate in improving color coding.
- Results in requests for "odd" colors, such as purple, which are not normally applied to steel.
- Confuses workers transferring from one company to another.
- Confuses warehousemen and shipping departments because similar types of steel carry different colors.

Steel Codes: Colorful Chaos

Despite the lack of standardization on color codes, they're popular with a growing number of consumers. More and more alloys make coding increasingly important

LIKE THE HERO of a western adventure story who jumps onto his horse and gallops off in all directions, steelmakers show much activity in color coding their products, but there's no co-ordination of the movement.

The demand for better identification arises because there are so many new steels on the market. Proponents of marking say that they're hampered by the lack of a standard color code. One steelmaker complains: "We put green paint on the end of our special grade of oil-hardening tool steel bars. One of our customers doesn't like green, so we give him orange. To add to the mixup, our leading competitor paints his oil-hardening tool steel bar a bright red."

Who Colors Steel—Producers of tool steels and some manufacturers of carbon and alloy cold-finished bars and stainless bars and plates use color for identification.

"Color coding is well established in tool steel," comment officials of Vanadium-Alloy Steel Co., Latrobe, Pa. "Even so, there's no standard system of color specifications. Some users want color on the ends of bars. Some want a longitudinal stripe. We have our own code, but if a customer wants his code followed, we will paint his colors on the steel."

Complicated Code—Jessop Steel Co., Washington, Pa., has a color code for 33 tool steel grades. A few of its customers ask for color coding on stainless bars and plates.

W. E. Falberg, general manager of sales, Joseph T. Ryerson & Son Inc., Chicago, reports that his company has extended and improved its long used system of color coding. Outgoing shipments, with the exception of sheets and some plates, are marked.

Users Want Color — Timken Roller Bearing Co., Canton, O., color codes its shipments on customer request. (About 60 per cent are colored.)

While each code is sufficient for its own purposes, spokesmen for the American Iron & Steel Institute, New York, say there are "too many steels and too few colors" to allow development of a standardized code for all steels. AISI believes the system is most satisfactory when consumers using a limited number of steel grades devise their own codes. "There are a great number of such codes, and to the best of our knowledge, they work excellently," reports Charles M. Parker, assistant vice president, AISI.

Becomes Important—Improving coding techniques was accelerated by the introduction of new alloy steels after World War II. The importance of proper marking got added impetus from the Defense department, which was dissatisfied with bundles of small-diameter tubing, marked only by a tag which was easily lost. The Pentagon now wants continuous marking, usually stamped in yellow ink, showing the producer's name, condition of the steel and heat number.

"Despite advances in color coding techniques, we have met a cool

But There's No Progress On a Standard Code Because:

- Too many steels, too few basic colors.
- There are disagreements over correct shade of each color.
- Carbon steel producers have little interest in color coding, which delays production, adds costs which might not be recovered.
- It's impossible to convey much information by color alone.
- Users want to identify the producer by color.

reception from our customers when we try to adopt a standard code," says a sales manager for an alloy bar manufacturer. He points out that several fabricators identify each of their suppliers by a distinctive color, causing them to resist adoption of a standard code for all suppliers.

Snags—Also holding up advances are skeptics who say that too little information can be imparted by color alone. Heat number and condition of the steel must be marked by other methods, they point out. In answer to complaints of this type, Pannier Corp., Pittsburgh, producer of marking equipment, reports that some firms plan to install machinery to paint and print steel in sequence.

Customers' theories about color, while followed scrupulously by steelmakers, can impede the advance of coding. A tool steel producer in the East once spent several weeks trying to duplicate the exact shade of purple desired by a customer. "The time we spent mixing paint would have been saved by a standard color code," a vice president relates.

Better Than Stamping — Tool steel producers generally believe the advantages of color coding far outweigh its disadvantages. "Our customers all want color for quick identification of the grade, although we also stamp necessary information on the steel," Jessop officials point out. They add that color can be seen at a distance, saving time required to look for a stamped identification.

Ryerson eliminated the tagging of shipments after introducing its coloring system. Its experience (and that of others) proves that customers appreciate coding and insist on it after trial. Most firms do not charge for the service.

Ex-Im Bank Loans $1 Billion

The Export-Import Bank authorized $1 billion in credits in 36 countries during the fiscal year ended June 30. The money will be spent on a wide variety of American goods.

Among large credits granted: Argentina, $115 million; Brazil, $195 million; Japan, $98 million; United Kingdom, $500 million.

The bulk of the money will be used in this order: 1. Railroad equipment. 2. Industrial equipment. 3. Agricultural commodities (mostly cotton). 4. Steel mill equipment. 5. Aircraft. 6. Transportation equipment other than rail or aircraft. 7. Electric power plants. 8. Highway construction. 9. Agricultural equipment.

Autos Set UK Pace

They bid for 34 per cent of Europe's car sales in U.S. British steel continues gain

THE BRITISH auto industry is booming as a result of increased exports. Sales in the U.S. of small, economy models (Austin, Morris, Hillman) have risen sharply to make the British hopeful of snaring more than one-third of the estimated 150,000 foreign car market in this country this year (STEEL, June 17, p. 67).

The British Automobile Manufacturers Association reports 17,300 units sold in the U.S. in the first four months of 1957, an increase of 154 per cent over the same period last year. British sales accounted for 34.6 per cent of all foreign cars bought in the U.S. in the four-month period this year.

British Motor Corp., one of the leaders, has increased its production 40 per cent over the first five months of 1956. It has exported 52 per cent of all vehicles produced in the UK.

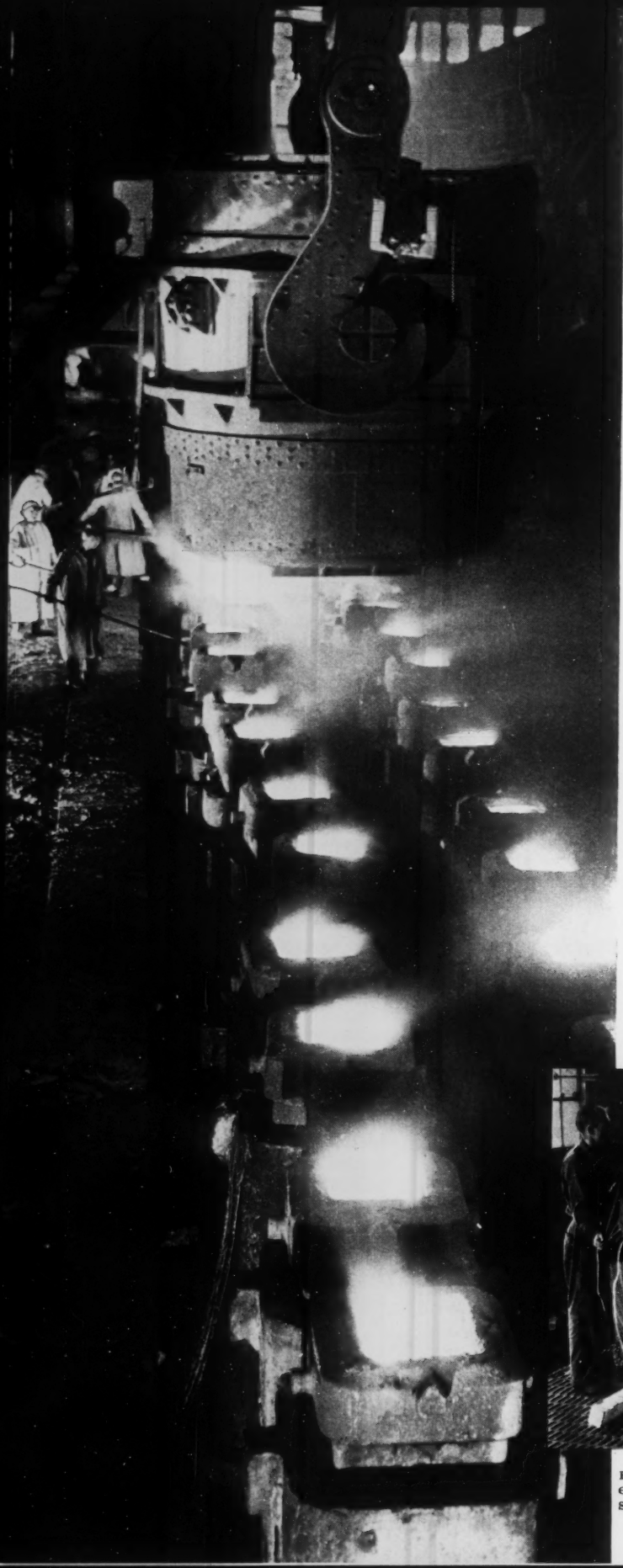
Impact Spreads—Auto plants have returned to night shifts and overtime. Most of the workers laid off last fall have been called back. Foundry work has been stimulated, the volume of castings growing steadily.

British steel production hit 487,520 tons a week in May for an annual rate of 25.3 million tons. Manufacturers of electric and diesel locomotives, railroad cars and track are taking large tonnages of steel. Much of this production is for the conversion of British railways to electric operation, but exports are rising.

Price Hike?—The British steel industry, which has absorbed several cost increases in the last few years without passing them along to consumers, may be forced to raise prices by fall.

Freight rates will be upped 10 per cent Aug. 1, and prices of coal and coke are scheduled to rise soon.

Shipyards, closed during the March strike, have pretty well recovered.



How Great Lakes Steel *teems* quality

You're up on the catwalk above the pouring platform along the open-hearth pit at Great Lakes Steel. Right below, one of the giant 250-ton teeming ladles is filling another train of hot-top ingot molds.

At no step in the production of good, deep-drawing steel is control of quality more important than in the teeming operation. For defects can easily develop *unless* the entire pouring operation is done exactly right . . . the way it is at Great Lakes.

For example, these hot-top molds are designed to eliminate shrinkage cavities in the finished product. A special lining compound of graphite or tar blankets the inside of every mold to form a highly protective shield for the delicate ingot surface.

And that's only a sample of the care Great Lakes takes *every step of the way* to maintain high and uniform quality steel!

The easiest way to reach us? Simply phone our nearest representative.

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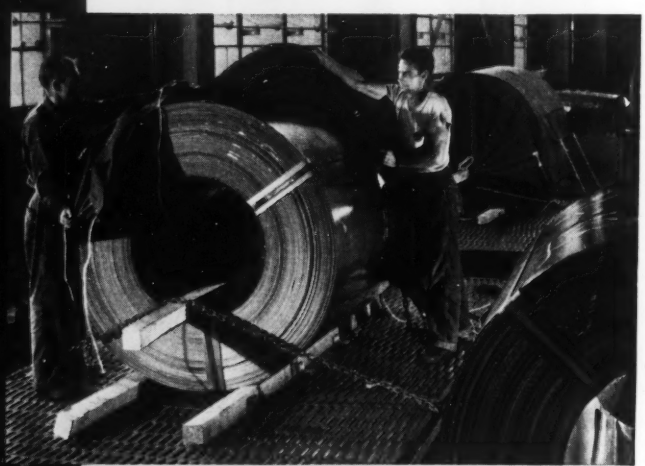

BUILT-IN QUALITY of Great Lakes steel is guarded through every step to final delivery. Here shipments of flat-rolled sheet coils are covered with tarpaulins for protection.

METROPOLITAN

Pays Off for AMC

SCOTSMAN

Holds Line at S-P

Little Two Auto Makers Rally

WITH THE END of the 1957 production year only a month away, it's time to see how the Little Two fared at the market place this year.

American Motors Corp. seems well on the way to bearing out President George Romney's prediction: "We'll be in the black in fiscal '58."

Down in Indiana, Studebaker-Packard Corp., still perched on a precarious marketing tightrope, shows some signs of turning the Curtiss-Wright, Daimler-Benz, S-P combine into a going concern.

The Heroes—Most of the credit for AMC's position is due Rambler and Metropolitan. At the end of May, Nash and Hudson lines had dragged sales to date down 7.5 per cent from last year's. Production of both lines was discontinued the first of this month and sales are moving up.

J. W. Watson, Metropolitan sales manager, says dealers have sold 5862 Mets, compared with 3105 a year ago. That's an 88.8 per cent increase.

Sell Big—Rambler has been having results almost as good. Roy Abernethy, vice president of automotive distribution and marketing reports Rambler sales in AMC's current fiscal year are 35.41 per cent ahead of last year's (67,631 units, compared with 49,497).

Finds a Home — There's little doubt in motordom's mind that George Romney has found a niche for his firm in the automotive market.

He has been the first to jump down from the "bigger and better" ladder most car builders have been climbing.

The Metropolitan and Rambler meet growing demands for small, economy cars.

Look Ahead — Rambler output stopped this week; '58 production starts at the end of August. For 1958, Mr. Romney plans to bring Rambler even more into line with

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his "smallness" pitch. Sales talk should be unique: "Smaller than ever—but with greater economy."

All AMC lines will be built from the same basic body shell. Styling changes will follow the sculptured look that's giving AMC cars a product identification, but they'll be minor because AMC emphasizes value and economy, not style.

Engine displacement will be boosted, but the same V-8 engine will be retained. Air suspension will be available; so will fuel injection.

Nash and Hudson will bring out station wagons. Their output will dominate N-H production.

With Confidence — Mostly, the sales boost is a reflection of Mr. Romney's long-time claim that the American motoring public wants a compact, economy car. AMC is ready to cash in.

Two items have appeared in the last month which indicate growing confidence in the company:

- American Motors has signed on 306 dealers since the first of the year, 54 of them in June.
- The company has closed down its Canadian plant in Toronto and has optioned 26 acres on which it will build a larger manufacturing and assembly facility. The enlarged plant will be back in production within two years.

South Bend Blues—Sales figures through May show that Studebaker-Packard is 46.6 per cent behind last year's registrations. However, they don't include the recently introduced Scotsman.

Sydney Skillman, vice president and general sales manager, says retail deliveries of Studebakers increased 21.7 per cent in June over May—mostly because of the Scotsman. Model run output of the economy car reportedly has been boosted from 6000 to 12,000 units.

Builds Hope—The sales pickup may be the reason Harold Churchill, S-P's president, hasn't revised his model introductory statement that the company looks to sales of 150,000 cars and trucks as a minimum marketing goal.

Mr. Churchill's assertion was based on an industry sales projection of 6.5 million cars. On a readjusted basis, it means the firm needs about 125,000 unit sales to break even.

At the end of six months, *Ward's Automotive Reports* shows S-P has turned out 43.319 vehicles; 23,000 shy of its first half effort in 1956. It will have to just about double its output in the second half.

Since dealer stocks were practically nonexistent at the beginning of the 1957 sales race, all the cars produced will have to be sold if the firm is going to fulfill Mr. Churchill's prediction.

Changes Planned — Studebaker-Packard is expected to shut down for model change-over at mid-August. Its '58 cars are undergoing another facelift.

There's talk that Packard will appear with a Hawk model similar to Studebaker's Golden Hawk. Torsion bar suspension will return to Packard cars. Fuel injection, a la Daimler-Benz, will be available on some models.

The Hawks supposedly will get more reverse angle rear window treatment. They'll be divested of much chrome in keeping with sculptured styling trends. The cars should have a rubber rub strip along the belt line and fin edges. Studebaker and Packard Clippers will come out with Hawk-like fins.

Competition Tough—Next year, the Hawks, which have been Studebaker's mainstay, will face direct competition for the first time when Ford introduces its four-seater T-Bird.

The Hawks may even have to fight for sales with some of the Mercedes Benz imports S-P is marketing through its dealers.

D-B Moves In—There's evidence that Curtiss-Wright, which is still handling the management reins for S-P and has a licensing agreement with Daimler-Benz A. G., is pushing the German car builder into even closer liaison with S-P management. Carl F. Giese, a director of Daimler-Benz, has been elected an S-P director.

Pessimists Talk—Although the Indiana auto maker seems to be rallying, it still has a long way to go to find a permanent niche in the market. Its Scotsman is selling, but they may not seem quite as economical as the Volkswagen or quite as stylish as the Rambler.

One line of reasoning heard around Detroit is that Curtiss-Wright will exercise its option next year to acquire 5 million shares of S-P stock for tax write-off purposes.

In time, the S-P dealer organization will be turned mainly into a distributorship for Daimler-Benz products. Some of the D-B cars may be assembled in S-P's South Bend plant along with whatever Scotsman and Hawk automobiles the market will absorb.

U.S. Auto Output

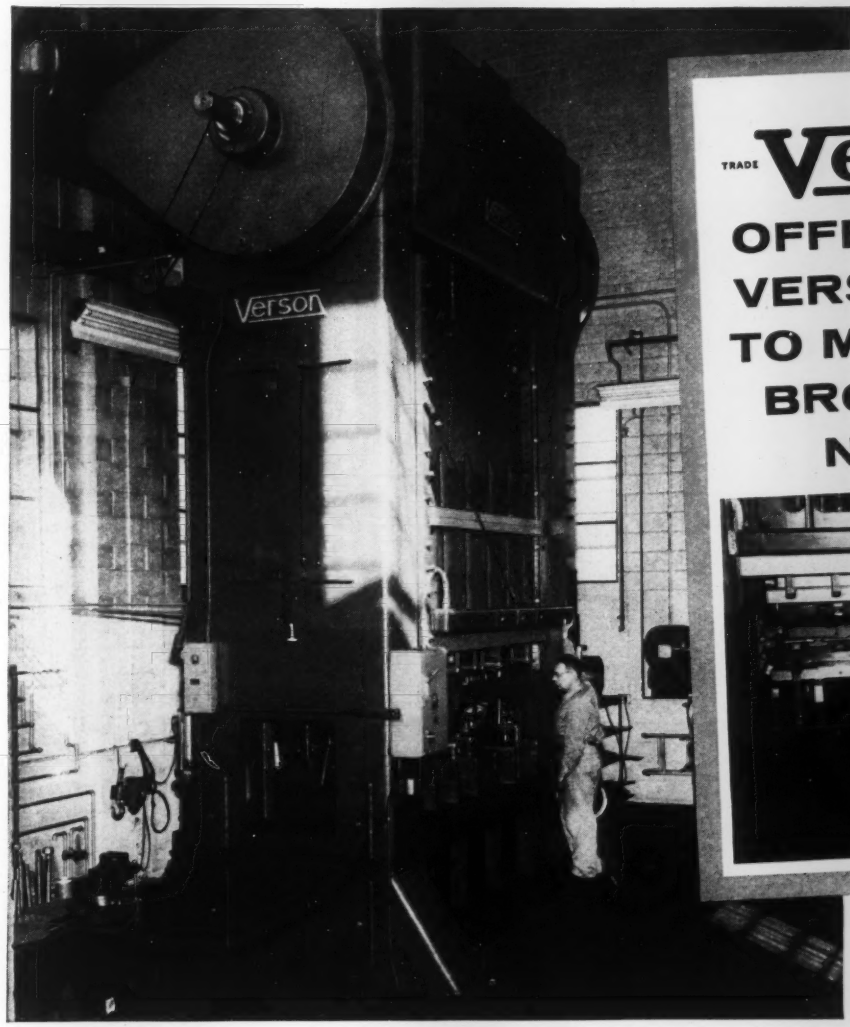
Passenger Only	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
6 Mo. Total	3,372,888	3,192,601
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
June 22	118,805	105,148
June 29	125,909	103,034
July 6	73,682	68,110
July 13	111,943	112,361
July 20	117,306†	113,416
July 27	115,000*	112,588

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Exhaust Notes

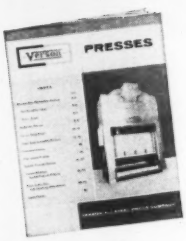
- In Chicago you now can rent or lease a foreign car by the day, week or month through Clark Auto Leasing Inc. The plan covers Jaguars, Rolls-Royces and smaller foreign makes.
- It's estimated that the water formed as a by-product of combustion in auto engines each year would fill a canal over 6 ft deep and 25 ft wide, running from coast to coast.
- Chrysler is reported to be working on an aluminum engine which can be used in a small foreign-type car.
- Willys Motors Inc., Toledo, O., says it has signed five more contracts to produce Mechanical Mules for the Army Ordnance Corps. This brings the total value of Mule contracts to $6.7 million.



TRADE **Verson** MARK

OFFERS YOU VERSATILITY TO MEET THE BROADEST NEEDS

A typical job at Westlof Tool & Die Co. — die tryout on progressive tooling. The press is also used for die tryout on Transmat type tooling.



Catalog G-57 presents basic data on all types of Verson presses. Write for your copy.

Die tryout for a tool and die shop is probably one of the severest tests of the versatility of a press. At Westlof Tool & Die Co., Detroit, Michigan, a 300 ton Verson double crank, straight side press is used for this purpose.

The press itself incorporates several features which are examples of the versatility Verson engineering can provide: The ram is equipped with three triple bank cushions adjustable right or left to 7″ centers. The bed has two large cushions, one right, one left. All cushions are independently controlled. The press is equipped for application of coil feeding equipment should it become necessary. Press speed is variable from 15 to 30 strokes per minute. Power adjustment of the slide is 15″.

If your requirements call for great versatility, bring your problem to Verson. For specific recommendations, just send an outline of your needs.

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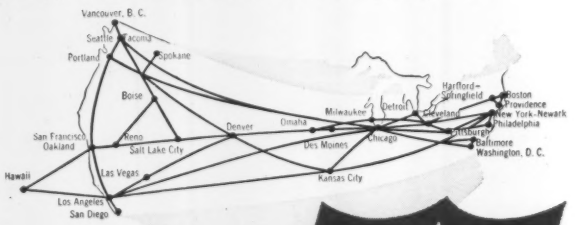
PHILADELPHIA to PORTLAND	$24.15
SAN FRANCISCO to BOSTON	$27.00

*These are the rates for many commodities. They are often lower for larger shipments. Rates shown are for information only, are subject to change, and do not include the 3% federal tax on domestic shipments.



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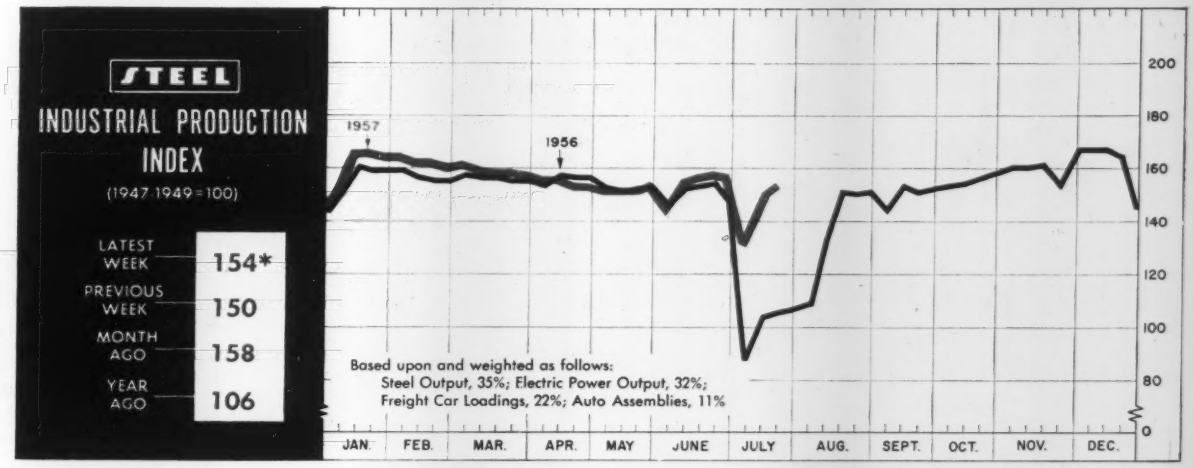

*Week ended July 20.

Still Plenty of Bounce in the Economy

THE WAY industrial production bounced back after the July 4 holiday shows that the over-all economy is still strong enough to overcome the weaknesses of some of its major parts.

Evidence—This year, STEEL's industrial production index (above) dropped 14 per cent, or 22 points on the scale, because of the unusually long holiday week end. By the week ended July 20, all but three of those points had been regained, bringing the index to a preliminary 154 (1947-1949=100). That was the average for the second quarter also. By comparison, in 1953, production dropped only 6.5 per cent and had regained practically all of it by the second week after the holiday. Two factors kept activity high then: The Korean War and July 4 falling on a Saturday. In 1954, production dropped 15.1 per cent although July 4 was on a Sunday. The economy was in a general decline, and the index did not regain its second quarter position until November. In 1955, when the holiday fell on a Monday, the decline was 10 per cent, with the pre-holiday level being regained two weeks later. The economy was on an upsurge. A comparison of this year's holiday period with that of last year is of little value because of the steelworkers' strike.

Conclusion—Nobody can deny that activity in home building, appliances, autos, steelmaking and a few other hard goods industries is something less than desired. Yet, 1957 suffers in comparison only with a phenomenally good fourth quarter of 1956. The concept of "ever onward, ever upward" has become so firmly entrenched in America's business thinking that to do anything less than break a record each year, or even each quarter, is to fail.

Case in point: STEEL's industrial production index averaged 158 for the first half of 1957 compared with only 155 for the correspond-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,079[1]	2,030	377
Electric Power Distributed (million kw-hr)	12,200[1]	11,964	11,125
Bituminous Coal Output (1000 tons)	7,495[1]	1,500	7,306
Petroleum Production (daily avg—1000 bbl)	6.800[1]	6,882	7,110
Construction Volume (*ENR*—millions)	$386.4	$325.5	$391.3
Auto, Truck Output, U. S., Canada (*Ward's*)	149,518[1]	143,700	146,948
TRADE			
Freight Car Loadings (1000 cars)	715[1]	692	648
Business Failures (Dun & Bradstreet)	256	190	251
Currency in Circulation (millions)[3]	$31,183	$31,313	$30,808
Dept. Store Sales (changes from year ago)[3]	+5%	+4%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22.291	$17,299	$22,427
Federal Gross Debt (billions)	$272.8	$272.9	$272.7
Bond Volume, NYSE (millions)	$19,245	$20,768	$19,398
Stocks Sales, NYSE (thousands of shares)	11,122	13,246	11,311
Loans and Investments (billions)[4]	$87.6	$88.2	$85.1
U. S. Govt. Obligations Held (billions)[4]	$26.0	$26.3	$26.3
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	210.45
STEEL's Nonferrous Metal Price Index[6]	216.4	216.6	259.6
All Commodities[7]	118.0	117.7	114.0
Commodities Other Than Farm & Foods[7]	125.4	125.4	121.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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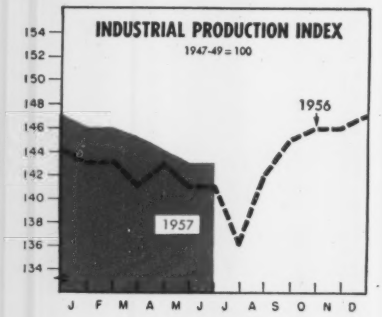
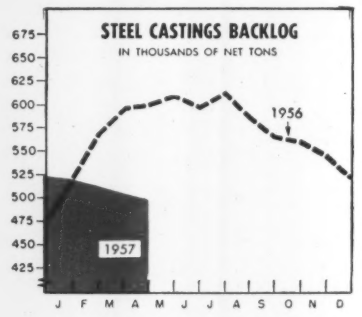
The American Cancer Society says that too many people die of it, NEEDLESSLY: That's why I have an annual medical checkup however well I feel. I know the seven danger signals. And when I want sound information, I get it from my Unit of the

AMERICAN CANCER SOCIETY

THE BUSINESS TREND





(Seasonally Adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1957	1956	1957	1956	1957	1956
Jan.	146	143	144	148	180	170
Feb.	146	143	143	146	180	168
Mar.	145	141	137	145	179	167
Apr.	144	143	136	146	176	170
May	143	141	133	141	175	167
June	143*	141	130*	136	176*	168
July	...	136	...	68	...	169
Aug.	...	142	...	124	...	172
Sept.	...	145	...	148	...	176
Oct.	...	146	...	147	...	177
Nov.	...	146	...	147	...	180
Dec.	...	147	...	145	...	183
Avg.	...	143	...	137	...	172

Federal Reserve Board. *Preliminary.
Charts copyright, 1957, STEEL.

	Shipments		Unfilled Orders*	
	1957	1956	1957	1956
Jan.	169.2	158.7	519.6	519.4
Feb.	154.9	165.4	511.8	567.3
Mar.	160.1	170.0	503.4	595.0
Apr.	162.5	163.7	497.6	600.2
May	....	178.2	....	608.3
June	....	164.7	....	597.1
July	....	118.0	....	611.2
Aug.	....	160.0	....	586.5
Sept.	....	155.0	....	563.0
Oct.	....	175.6	....	558.5
Nov.	....	164.1	....	545.9
Dec.	....	158.7	....	521.8

*For sale. U.S. Bureau of the Census.

ing period of 1956. But the average for the fourth quarter of last year was 160.

Or take the Federal Reserve Board's seasonally adjusted industrial production index. (See chart and table above). The first half average this year was 144.5 (1947-1949=100), compared with the year-ago average of 142. Assuming that the adjustments are equitable, 1957 has been a better year so far than its counterpart in 1956. However, the tremendous upsurge after the settlement of last year's steel strike boosted the index to a 146.3 average in the fourth quarter.

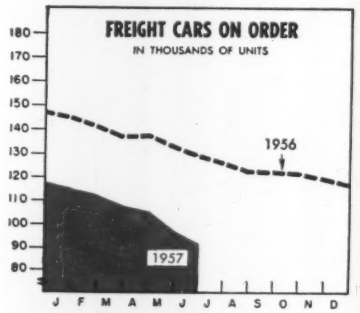
Matter of Direction—The point is that 1957 will turn out to be just as good as 1956 on the average. But there will be one important difference: In 1956 the trend was generally up, while the trend this year is slightly down. Ten years from now, observers will say that both years were on a par. But right now, because some of the steam has gone out of last year's boom, we tend to underestimate this year's performance. There is no clear-cut evidence yet that the direction of today's curve is anything but a temporary adjustment to growing pains. There is plenty of evidence that demand for industrial products will continue to grow because of greater population and a rising standard of living.

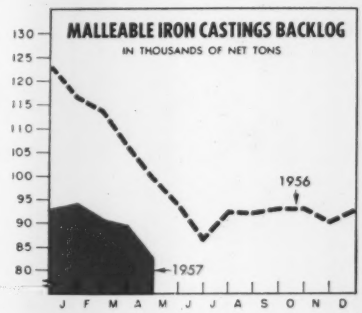
Railroad Activity High

Activity in railroad car shops is the chief reason for the improvement in the steel castings picture (see table, above). In June, the railroads received 8377 new freight cars, compared with 8824 in May and 5550 in June, 1956. Coupled with new orders for only 4918 cars in June, the backlog continued its decline (see chart, page 91). At the present rate, it would take car builders almost 15 months to work off the unfilled orders. Also in June, Class I railroads installed 125 new locomotive units, up from the 119 delivered in May.

Business Not Up to Snuff

The summer doldrums have brought some concern to purchasing agents, according to the July survey of the National Association of Purchasing Agents. Most respondents are looking for an upswing in the second half, but they





	Awards		(end of month)	
	1957	1956	1957	1956
Jan. ..	5,328	1,818	114,656	144,946
Feb. ..	6,065	1,675	111,965	141,437
Mar. ..	5,359	1,618	107,708	137,070
Apr. ..	6,429	6,559	105,190	137,436
May ..	3,423	2,403	97,006	133,072
June ..	4,918	2,859	91,810	129,409
July ..	....	2,642	.....	126,194
Aug. ..	....	2,575	.....	122,870
Sept. ..	....	3,949	.....	122,421
Oct. ..	....	6,532	.....	122,250
Nov. ..	....	4,172	.....	119,626
Dec. ..	....	4,992	.....	117,320
Total .	....	41,794		

American Railway Car Institute.

	Shipments		Unfilled Orders*	
	1957	1956	1957	1956
Jan.	86.0	93.6	93.9	116.5
Feb.	78.0	93.6	90.7	113.6
Mar.	78.0	86.9	89.4	106.5
Apr.	80.3	83.3	83.1	99.6
May	...	78.8	...	93.7
June	...	75.6	...	86.2
July	...	54.3	...	92.1
Aug.	...	74.4	...	91.9
Sept.	...	69.4	...	92.6
Oct.	...	81.5	...	92.7
Nov.	...	82.7	...	90.0
Dec.	...	76.4	...	92.3
Total ...	...	950.5		

*For Sale. U.S. Bureau of the Census.

have lost a bit of their optimism within the past month. They admit that business activity is at a high level, but conditions are not quite meeting expectations.

Both the production and new order situations have deteriorated since June. A great majority still say that both are the same or better than a month ago, but 25 per cent say production is off, and 29 report a decline in new orders.

Building May Taper Off

Construction put in place may start tapering off toward the end of this year. According to *Engineering News-Record,* awards for heavy construction through the first 29 weeks of 1957 still lag behind those of the corresponding 1956 period by 17 per cent. Considering the lead time between the letting of contracts and construction, some of the early 1957 decline should be showing up soon in construction figures.

For the fourth time in the last six months, Dun & Bradstreet Inc. reports a year-to-year decline in building permits issued. In its survey of 217 cities, the June figure of almost $544 million was 2.7 per cent below that of the total for the 1956 month. Despite the four relatively poor months, the first half dollar total is 1.2 per cent above the year ago amount.

Trends Fore and Aft

- Personal income in June rose to an annual rate of $344 billion, almost $1 billion higher than in May, reports the Department of Commerce.
- June shipments of resistance welding equipment were more than $2.5 million for the fourth consecutive month, reports the Resistance Welder Manufacturers' Association.
- New orders for industrial furnaces in June were $2,974,000, 37 per cent beneath the comparable 1956 figure, says the Industrial Heating Equipment Association. Steel mill furnace orders during the first half of 1957 amounted to $8,373,000, down 60 per cent from the first half total of 1956.
- Business failures declined in June to 1084, compared with the May total of 1200 and the June, 1956, figure of 1105, says Dun & Bradstreet. Only businesses with liabilities of $1 million or more failed to show improvement in June over May.

COLD HEADED FASTENERS COST LESS

and usually give better performance

The designer need not be restricted to standard fastener sizes when they do not meet the requirements of his application. It is often much less expensive to specify a rivet, nail, screw, pin or stud to meet the task exactly as the application requires, than it is to compromise its function for the sake of "standards." In this regard, we offer the equally important advantages of flexibility according to our customers' design changes and production by high speed, quantity techniques. While there is nothing mysterious about the cold heading process, experience has proved it to be of inestimable value for getting maximum quality and output at a minimum cost. While the really spectacular advantages in cost show up in runs of several thousand pieces, we are also able to take care of your short run requirements. We welcome and expect manufacturers to come to us for advice and assistance concerning their fastener problems.

Given complete specifications, including a drawing and an idea of the application, we can quickly tell you whether or not it will be advantageous to have your fastener or part JOB-DESIGNED by HASSALL. The remaining important aspect of our service to you is the ability to get into production quickly and make prompt shipment.

Write for a copy of our new booklet, "What the Designer Should Know about Cold Heading."

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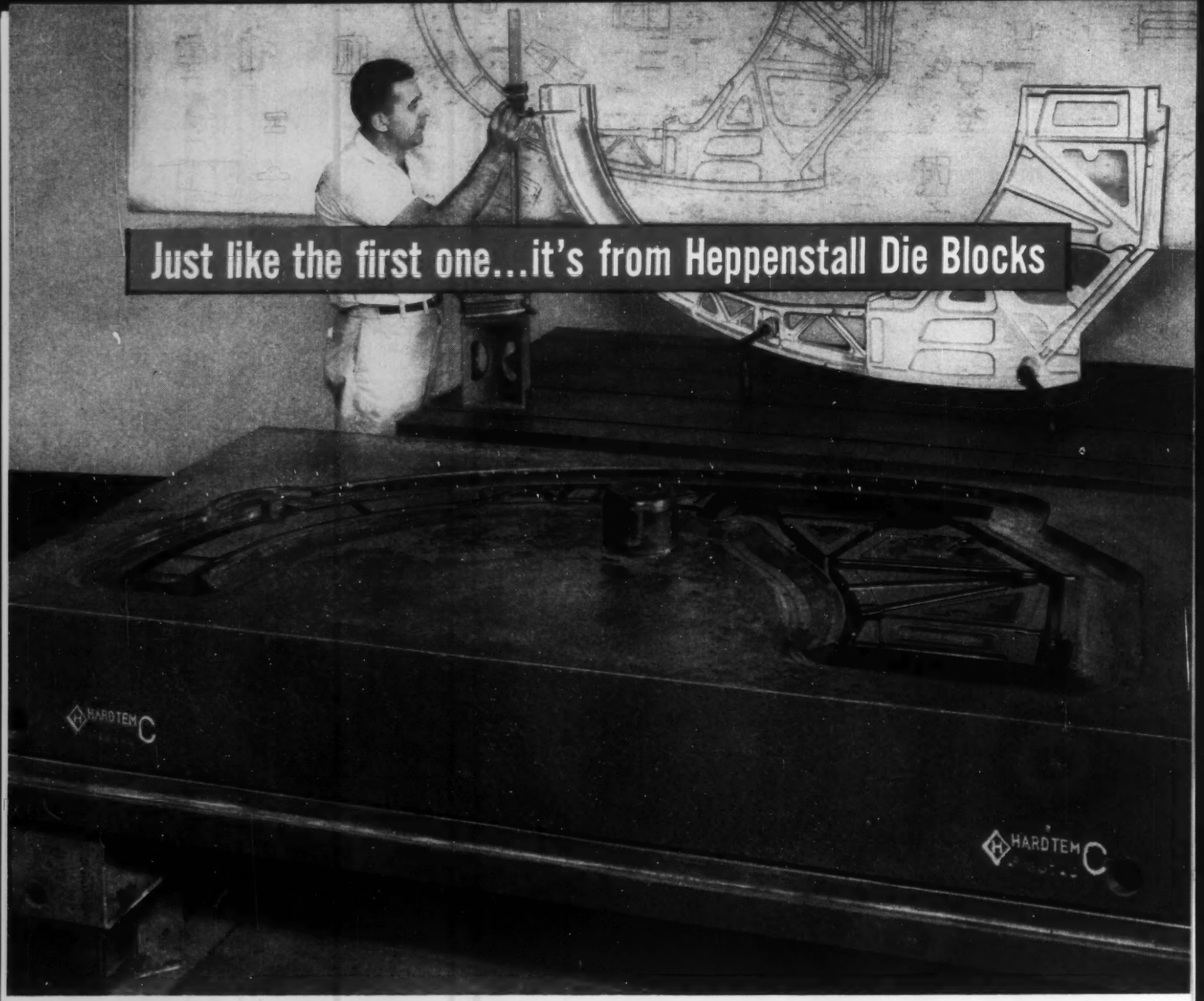

You get precision forgings... economical sinking with Heppenstall

Holding dimensions is one of the big plusses you get with Heppenstall Hardtem Die Blocks. A case in point is the production of these half-bulkheads for jet fighters at the Air Force Heavy Press Plant, Cleveland, Ohio, operated by Aluminum Company of America. Hardtem "C" Blocks are turning out these high strength aluminum alloy forgings to close tolerance specifications . . . and holding dimensions in forging after forging.

Machinability of Heppenstall Hardtem rates high, too. That's why so many tough designs are laid out on Hardtem Blocks. Veteran Die Sinkers know they can expect savings in cutting time, longer tool life, and more accurate sinkings from Heppenstall Die Blocks.

Forged on all six faces from special Heppenstall Steel, Hardtem and other Heppenstall Die Steels are manufactured in a wide range of hardnesses to match varying customer requirements of application and machinability. If you're looking for better die block machinability and service life, contact your Heppenstall Representative. He can quickly get the one best answer for you.

These five Heppenstall Warehouses carry stocks of the most popular size die blocks:

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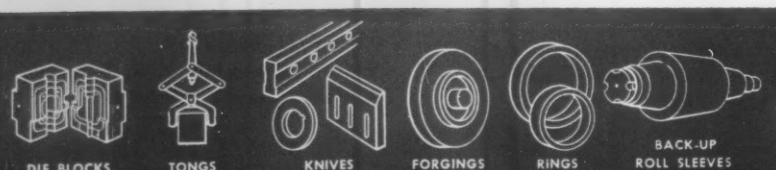
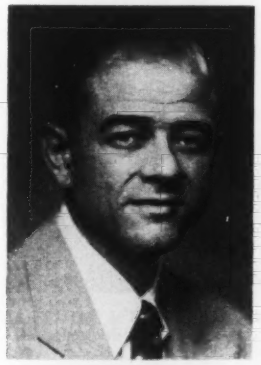


HEPPENSTALL

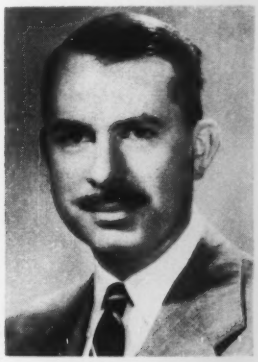
... the most dependable name in die blocks

PITTSBURGH 1, PENNSYLVANIA



E. G. COUNSELMAN
H. K. Porter industrial sales

KARL H. BAESSLER
CF&I wire product dev. post



IAN K. MacGREGOR
joins Climax Molybdenum

J. KEITH LOUDEN
joins Lebanon Steel Foundry

E. G. Counselman was appointed manager-industrial sales for **H. K. Porter Company Inc.**, at New York. He is succeeded as Washington representative by **William E. Haines**, former director of industrial defense, Department of Commerce.

Colorado Fuel & Iron Corp. appointed **Karl H. Baessler** director of wire product development for its Colorado, Wickwire Spencer and Pacific Coast Divisions. Former works manager, Pacific Coast Division, he continues headquarters at the Oakland, Calif., plant.

Joseph S. Sherer Jr. was elected president of **Vinco Corp.**, Detroit, to succeed **E. J. Eggart**, resigned. Mr. Sherer was president of Reo Motors Inc.

John J. Hillsley Jr. was elected vice president, **American LaFrance Corp.**, Elmira, N. Y. He continues head of purchasing and assumes responsibilities for inspection, quality control and traffic.

Daniel W. Cameron, former vice president-manufacturing for Alco Products Inc., Schenectady, N. Y., was named vice president-manufacturing of **Montreal Locomotive Works Ltd.**, Montreal, Que., an Alco affiliate.

Harold E. Stahl was made sales manager, Rochester, N. Y., Products Division, **General Motors Corp. Kenneth F. Lingg** was made assistant sales manager. Mr. Stahl replaces **F. D. Lowell**, resigned.

Ian K. MacGregor joined **Climax Molybdenum Co.**, New York, as vice president-eastern operations. He was general manager of Manning, Maxwell & Moore Inc.

Aluminum Co. of America named **Stanley R. Kuhns** to the new post of assistant works manager-Cleveland operations. He is succeeded as manager of the Cleveland ingot plant by **Marvin E. Gantz Jr.**

Louis J. Aure was made chief engineer in the Michigan area for **Columbus Bolt & Forging Co.**, Columbus, O., in charge of new products and field service. He is at Detroit. **Wesley P. Hellwig** joins the company as assistant purchasing agent to succeed **Robert J. Brillhart**, now cost controller.

Dura-Vent Corp., Redwood City, Calif., elected **R. B. Stone** vice president and sales manager. Former midwestern sales manager for Peerless Mfg. Division, Dover Corp., he now has headquarters in Louisville and sales offices in the Merchandise Mart, Chicago.

Ralph V. Little Jr. was named manager, product engineering department, **Brush Electronics Co.**, Cleveland, a division of Clevite Corp. He was assistant manager.

William J. Borwick succeeds **Hal P. Kibbey**, resigned, as assistant vice president - commercial, **U.S. Steel Supply Division**, Chicago, U.S. Steel Corp. **Earl L. Simanek** was made district manager for the St. Louis warehouse, replacing Mr. Borwick.

Lebanon Steel Foundry, Lebanon, Pa., named **J. Keith Louden** vice president and chief executive officer. He was vice president, York, Pa., division, Borg-Warner Corp. and general manager of its commercial division. Mr. Louden assumes his new position immediately and will become executive vice president of Lebanon Oct. 1, succeeding **Edward G. Williams**, who retires on that date. **A. W. Blecker** was made assistant sales manager.

A. A. Straub Co. Inc., Cleveland, made **N. L. Lamprecht** sales manager of its atmosphere generators department. Before joining the firm earlier this year, he was assistant sales manager for Air-Maze Corp.

Alexander Hays III joined **Pittsburgh Pipe & Tube Co.**, Pittsburgh, and will be in charge of its pipe and tube division. He was with American Radiator & Standard Sanitary Corp.

James F. Connaughton was elected to the new post of executive vice president, **Wheelabrator Corp.**, Mishawaka, Ind. **Harold M. Miller**, vice president, was advanced to senior vice president.

John H. Diehl, assistant to the vice president in charge of **Rockwell Mfg. Co.'s** Power Tool Division, was named general manager of the Bellefontaine, O., power tool plant.

Floyd K. Nye, secretary-treasurer, **Buck Mfg. Co.**, San Jose, Calif.,

LESTER D. MARTIN
Oster Mfg. v. p.

DIXON FISKE
American Electronics div. post

DR. ARTHUR C. RUGE
B-L-H electronics research

FREDERICK J. KELLER
American Saw divisions sales

was promoted to general manager.

Lester D. Martin was elected vice president, **Oster Mfg. Co.**, Wickliffe, O. He continues as treasurer. **Arthur S. Gould**, vice president-sales, retired.

Dixon Fiske was made manager, electromechanical division, **American Electronics Inc.**, Los Angeles. He was field engineer for AEI.

Leonard C. Lindstrom was made sales manager, air impeller division, **Torrington Mfg. Co.**, Torrington, Conn.

Philip B. Zeigler was made chief engineer, **Saginaw Steering Gear Division**, Saginaw, Mich., General Motors Corp. He succeeds **C. W. Lincoln**, now technical assistant to the general manager.

Tom Conway was made director of manufacturing services of **Borg-Warner Corp.**, Chicago. He was general works manager, Lycoming Division, Avco Corp.

Carter B. Haley was made national sales manager, industrial division, **Durkee-Atwood Co.**, Minneapolis. He was manager of distributor sales. **E. I. Olson** was made manager of the division's field engineering. **James E. Huettl** was made assistant sales manager.

Michael Toth was made manager of turbocharger sales, **De Laval Steam Turbine Co.**, Trenton, N. J. He was acting manager.

Arthur R. MacNeil was named vice president, **MacDermid Inc.**, Waterbury, Conn. He continues as New England sales manager.

Baldwin-Lima-Hamilton Corp. appointed **Dr. Arthur C. Ruge** director of research development, electronics and instrumentation division, Waltham, Mass. **Robert P. Lathrop** was made manager-research and development.

Andrew G. Forrest was named assistant to the chief metallurgist in the Cleveland offices of **Republic Steel Corp.** **Joseph R. McVicker** was made assistant chief engineer-mining districts at Cleveland.

Frederick J. Keller was made director of sales for **Vermont Tap & Die Co.** and **Deluxe Saw & Tool Co.**, both divisions of American Saw & Tool Co., Louisville. He was vice president of Midwest Tool & Cutlery Co.

Ivan K. Knight was made general sales manager, Ottawa, Kans., Steel Division, **L. A. Young Spring & Wire Corp.**

M. F. Smith was made New York

WILLIAM R. HOUGH

WALTER H. HABER

HUGH D. LUKE

RICHARD A. GEUDER

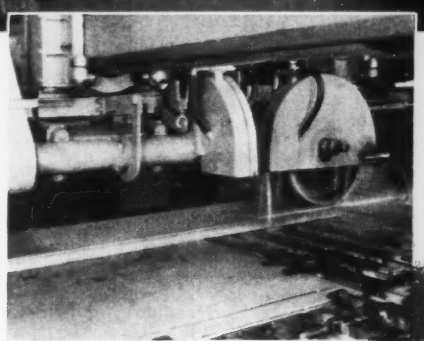
Hold New Offices at Reliance

Reliance Electric & Engineering Co., Cleveland, created four new offices—three of operations groups, one in marketing. Elected vice presidents-operations groups are **William R. Hough, Walter H. Haber** and **Hugh D. Luke**; and to the office of vice president-marketing, **Richard A. Geuder.** Mr. Hough is also vice president-engineering, a position to which he was elected in 1948. Mr. Geuder became general manager-marketing last March. Mr. Haber has been division manager, Ashtabula, O. Mr. Luke has been Ivanhoe division manager.

Now... STAINLESS PLATE

Custom-cut to Your Exact Specifications

Exclusive New Wet-Process Abrasive Rotary Saw Enables The House of Stainless to Furnish Stainless Steel Plate of Any Analysis ...Cut to Finished Dimensions!



• New Wet-Process Ty-Sa-Man Abrasive Saw now in operation at Chicago Steel Service Company, Chicago, Ill.

As an added service to House of Stainless customers, Chicago Steel Service Company has installed this latest type Ty-Sa-Man abrasive cutting machine—the only equipment of its kind devoted exclusively to cutting stainless steel plate.

Here's what this machine makes possible. When you need plates or bars of any analysis in other than stock sizes, The House of Stainless can now cut the material you need to finished dimensions. Cleanly. Smoothly. Squarely. Without heat tint. Without carbide precipitation. And most important to you—the material you want comes ready to use, eliminating grinding or cleanup, saving you time, and reducing material waste substantially.

The combination of this new equipment and our complete stocks of plate, in sizes up to 80" x 240" and as thick as 3", enables The House of Stainless to provide one-stop service on all your stainless plate and bar requirements.

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ROBERT G. ALLEN
Bucyrus-Erie v. p.

HARVEY L. SPAUNBURG JR.
Hartford Special mfg.-mgr.

DONALD E. FRY
Copeland chief engineer

district manager, **Republic Rubber Division,** Lee Rubber & Tire Corp.

Robert G. Allen was elected to a newly created vice presidency at Bucyrus-Erie Co., South Milwaukee, Wis. He was president of Borg-Warner Corp.'s Pesco Products and Wooster Divisions.

Harvey L. Spaunburg Jr. was made manufacturing manager, **Hartford Special Machinery Co.,** Hartford, Conn. He is succeeded as sales manager, contract sales division, by **James J. Jones.**

R. L. Scott was made manager of mining supply sales, western division, **Colorado Fuel & Iron Corp.,** with headquarters in Denver. He succeeds the late **Harold M. Holkestad. Howard K. Schmuck Jr.** was made assistant manager.

Roy L. Hoeck was made New York district sales manager, **Magnethermic Corp.,** with headquarters at Westfield, N. J.

Robert R. Bowman was promoted to Buffalo district sales manager, **Harbison-Walker Refractories Co.** He was sales representative.

Leonard J. Thorn joined **Enos & Sanderson Co.,** Buffalo, as product manager of cutting tools and abrasives. He was sales manager of R. C. Neal Co.

Stephen K. Wilmot was made manager of **Swartwout Co.'s** Tulsa, Okla., district office.

T. G. Granryd was made manager, product improvement department, **Frank G. Hough Co.,** Libertyville, Ill. He was project engineer.

Joseph Fryer is now sales manager for **Task Corp.,** Anaheim, Calif.

Donald E. Fry was made chief engineer, **Copeland Refrigeration Corp.,** Sidney, O. **Charles A. Lessing** was made assistant chief engineer.

J. E. Barber was made sales manager of **Black & Webster Inc.,** Newton, Mass. He had been division sales manager with Milford Rivet Co. and staff assistant to the director of the coal chemical sales division, U.S. Steel Corp. Before joining Black & Webster, Mr. Barber was with Kendall Mills.

William L. Fennimore was made assistant general superintendent of **Pencoyd Steel & Forge Corp.,** Philadelphia. He was plant superintendent of fabrication and machining in the Daystrom Instrument Division, Daystrom Corp.

Weir Adamson was appointed to handle U.S. sales of cobalt and iron ore produced by **International Nickel Co. Inc.,** New York.

George A. Pyle was made assistant manager-stainless steel products sales, **American Steel & Wire Division,** Cleveland, U.S. Steel Corp.

Walter W. Hasenzahl Jr. joined **Everwear Mfg. Co. Inc.,** Springfield, O., as vice president-general manager. He was general manager of manufacturing at Trailmobile Inc.

Lamson Mobilift Corp. promoted **Donald L. Clawson** to district manager - northeastern region, with headquarters in Long Island City, N. Y.

George Bennethum was made assistant manager of alloy steel sales for **Carpenter Steel Co.,** Reading, Pa. **T. Allen Washburn** was named assistant manager of tool steel sales.

George H. Durlester fills the new post of general manager, industrial engineering in the metal division of **Continental Can Co.** He is in New York.

O. W. Carrico was made general manager of **Rheem Mfg. Co.'s** automotive division, Fullerton, Calif. He succeeds **F. G. Fisher,** resigned.

Robert G. Schmidt was named project manager for **Callery Chemical Co.'s** new plant at Lawrence, Kans. **Stanley J. Demski** was made construction manager.

E. H. Eggers was made district manager, Cambridge, Mass., office, **Vulcan Crucible Steel Division,** H. K. Porter Company Inc.

John L. Lewis was made manager at the Shiffler plant of U.S. Steel Corp.'s **American Bridge Division.** He joined the Lawrenceville, Pa., plant in 1948. He succeeds **W. O. Mitchell,** named manager of operations for United States Steel Homes Division.

Paul W. Martin was named vice president-engineering, **Dor-O-Matic Division,** Republic Industries Inc., Chicago. He was chief engineer.

OBITUARIES...

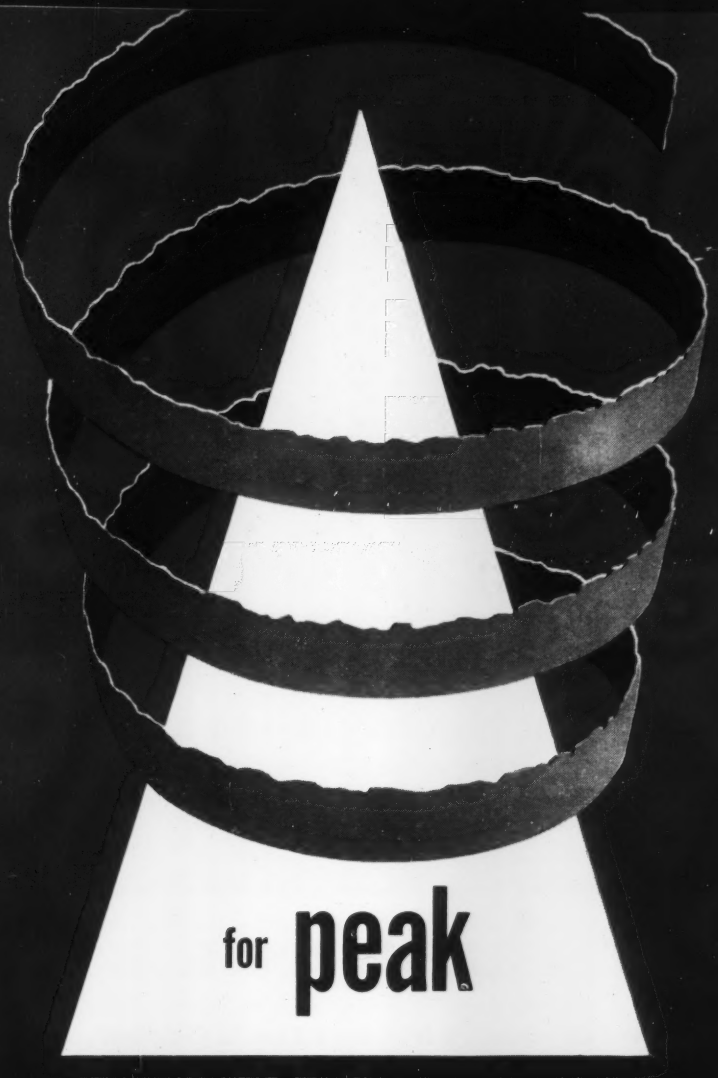
Walter C. Kerrigan, 64, assistant to the president, **International Nickel Co. of Canada Ltd.** and its U.S. subsidiary, International Nickel Co. Inc., died July 16 in New Brunswick, N. J.

Howard H. Needham, 63, manager, atomic development section, research division, **A. O. Smith Corp.,** Milwaukee, died July 13.

Kershaw Harms, 58, vice president, **American Smelting & Refining Co.,** New York, died July 12.

Maurice D. Larkin, 79, president and treasurer, **M. D. Larkin Co.,** Dayton, O., died July 9.

Edward F. Wells, secretary-treasurer, **James Morrison Brass Mfg. Co. Inc.,** Toronto, Ont., died July 10.



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high speed steel performance

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Supreme

TYPICAL REASONS-WHY . . .

turning

On B-1113 stock, cast alloy gave 500 pieces per grind. *Vasco Supreme* delivers 3500-4000 pieces—upping production 20%.

milling

Cast iron cams. Standard high speed steel formerly used gave 7 cams per grind—*Vasco Supreme* now cuts 135!

drilling

Glass fiber. Standard high speed steel on this material, 4-5 holes. *Vasco Supreme*, 1400 holes before sharpening.

form cutting

SAE 4340. Using 18-4-1 nitrided, customer got 380-400 pieces per grind. *Vasco Supreme* changed matters: 906-1230 pieces.

nibbling

Steel plate. Large-diameter rings, 3/16" thick, are nibbled by tool and die cutting inside and outside of circle. *Vasco Supreme* gives twice the production per grind over competitive grade.

compacting

Electrolytic iron powder. *Vasco Supreme* compacting punch produced 4,000,000 parts (gears) during run.

blanking

High silicon sheet. On indexing type lamination die, previous high-carbon, high-chrome steel made 3000 hits . . . *Vasco Supreme* ran 65,000.

scalping

Hard drawn brass and copper. Dies of *Vasco Supreme* provide 300 per cent longer life than 18-4-1 steel.

and for your own particular application

Give first thought to Vasco Supreme. Have a metallurgically-trained Vanadium-Alloys sales engineer check with you on the benefits you can expect, and let Supreme deliver!

VANADIUM-ALLOYS STEEL CO.

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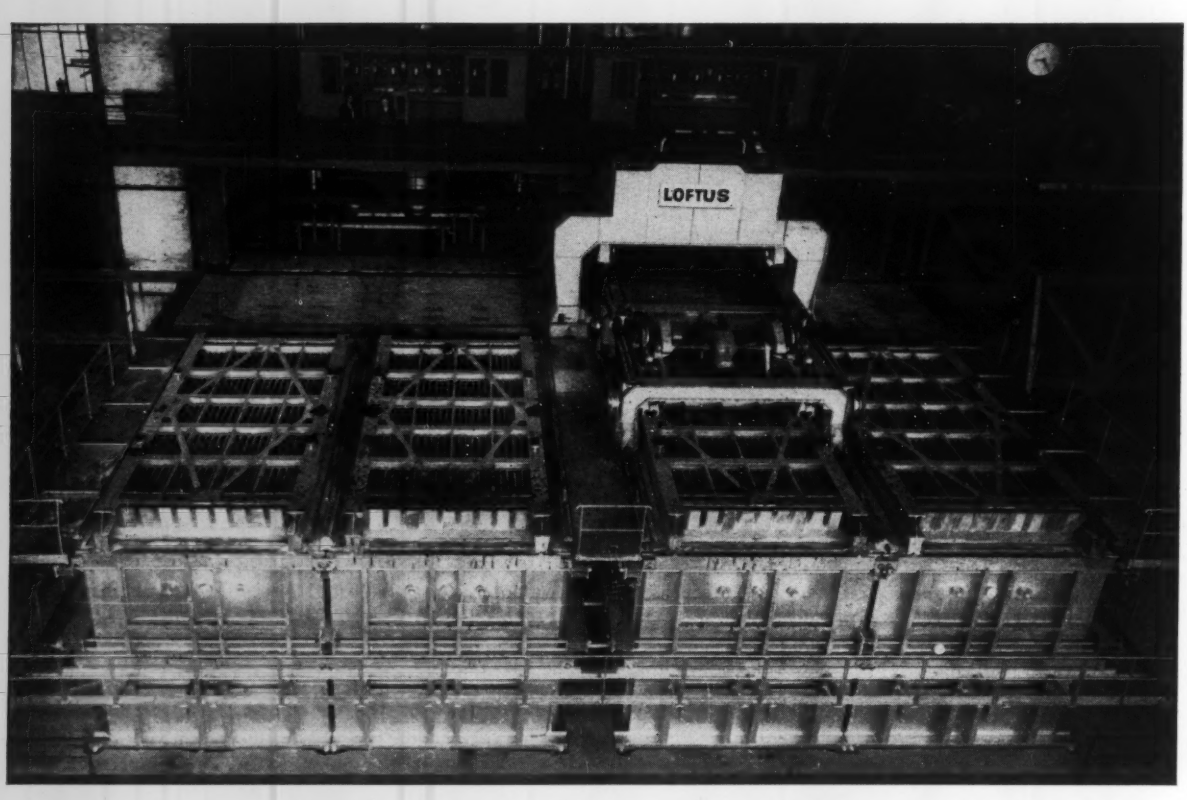

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Enters New Field

Avco Mfg. Corp. will market porcelain enamel service station structures

AVCO MFG. CORP. is the newest entrant into the architectural porcelain wall business. Its American Kitchens Division, Connersville, Ind., will market a new kind of service station structure. The packaged unit features new techniques in fabrication and erection.

The division has been a leading fabricator of porcelain and steel products for many years. Curry Stoup, general manager of the division and Avco vice president, says one of the most important contributions his firm will make is an improved prestressing process which assures that each panel will remain flat—a major problem with architectural porcelain wall components.

The use of architectural porcelain enamel for construction is expanding rapidly. Dollar volume in 1940 was $1 million. By 1953, it had climbed to an estimated $25 million; the minimum estimate for this year is $72 million.

Builds Warehouse in Wichita

Marsh Steel Corp., distributor of aluminum and steel products, will finish construction of a 15,000 sq-ft warehouse in Wichita, Kans., by Aug. 1.

Changes Name, Address

Automatic Temperature Control Co., Philadelphia, subsidiary of Safety Industries Inc., New Haven, Conn., changed its name to Automatic Timing & Controls Inc.

Operations will be transferred to a new $750,000 plant in King of Prussia, Pa., by Aug. 5. The firm makes components for industrial automation.

Moves Into Added Facility

Hamilton Standard Division of United Aircraft Corp. will move into a new 410,000 sq-ft plant at the rear of its main plant in Windsor Locks, Conn., during the first two weeks of August.

At full scale operation, expected by the end of October, employment will be between 2500 and 3000. The plant will make jet engine fuel controls.

Salem-Brosius Gets Lukens Job

Salem-Brosius Inc., Carnegie, Pa., will design and build nine soaking pits, an Auto-Floor box charging machine and several material handling trailers for Lukens Steel Co., Coatesville, Pa.

Dresser Expands in Two Cities

Dresser Industries Inc.'s manufacturing division at Bradford, Pa., completed a $1-million compression fitting plant in Wellsboro, Pa. The 100,000 sq-ft unit will eventually employ 250. The division also added 33,000 sq ft to its Bradford plant.

Beaird Creates Research Unit

J. B. Beaird Co. Inc., Shreveport, La., created a New Product Research & Development Division and named John MacKinnon as its director. A subsidiary of American Machine & Foundry Co., Beaird makes LP-gas distribution systems and package compressors, air receivers, offshore piling and rail car tanks.

Illinois Gear Expands Plant

Illinois Gear & Machine Co., Chicago, will double floor space at its heavy manufacturing division. Machine tools will account for more than half of the $2-million expenditure.

Will Improve Explosives Plant

Atlas Powder Co., Wilmington, Del., will spend $4 million to replace nitric acid and ammonium nitrate facilities at its Webb City, Mo., plant during the next nine months.

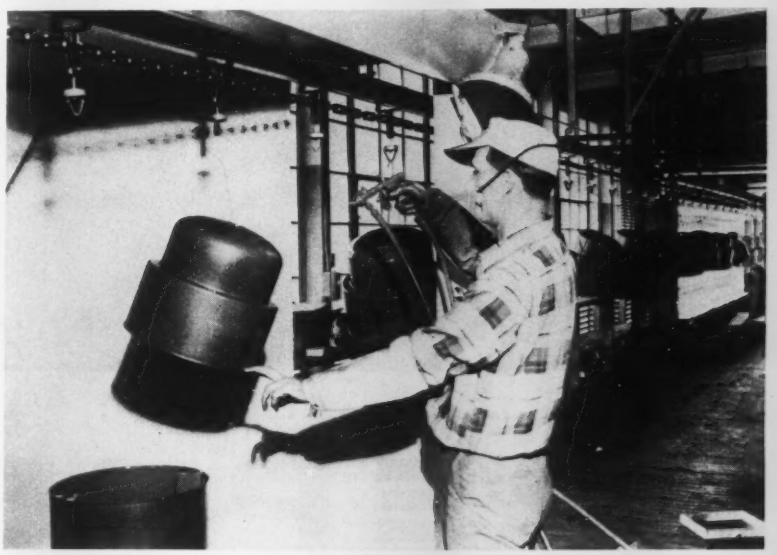
Expands Engineering Facilities

Bethlehem Steel Co. began construction of an engineering office building for the Pottstown Works of its Fabricated Steel Construction Division. The 22,000 sq-ft facility will be completed this year.

Opens Warehouse in Buffalo

Wheeling Corrugating Co., Wheeling, W. Va., opened a new 40,000 sq-ft warehouse in Buffalo on June 13. O. F. Blaske is manager of the Buffalo branch. Products stocked include galvanized sheets, roofing, metal lath, expanded metal, suspension systems

(*Please turn to page* 102)

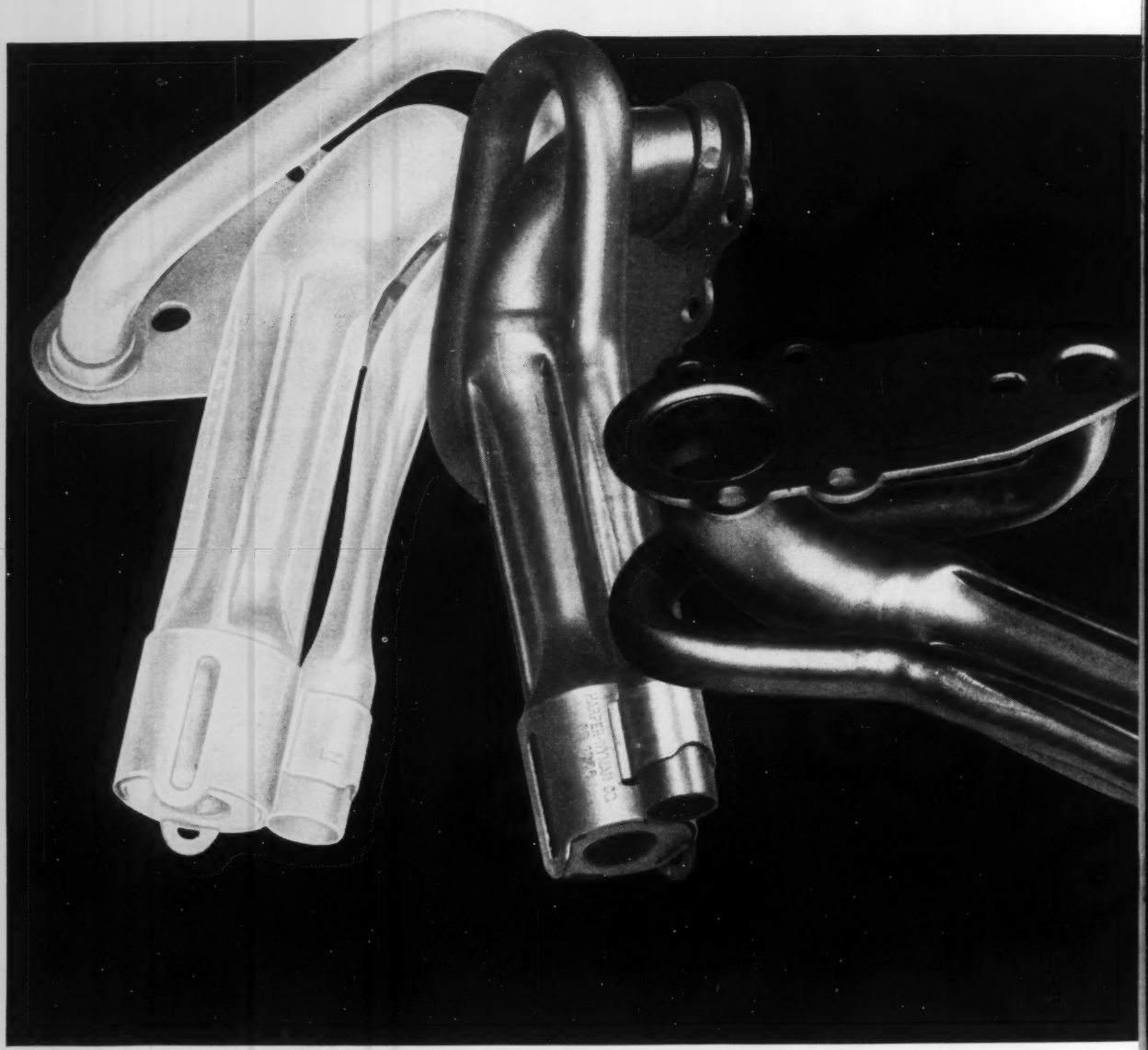


Worcester Pressed Steel Mechanizes Paint Line

This line at Worcester Pressed Steel Co.'s plant in Worcester, Mass., provides a continuous flow of stamped parts through an 8-ft, air-finishing spray booth. It'll handle practically any kind of paint. From the booth, a conveyor system carries the parts to a drying oven or to an area where they air dry

Range-burner manufacturer does

REPUBLIC ELECTRUNITE



REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

everything but tie knots in this STEEL TUBING

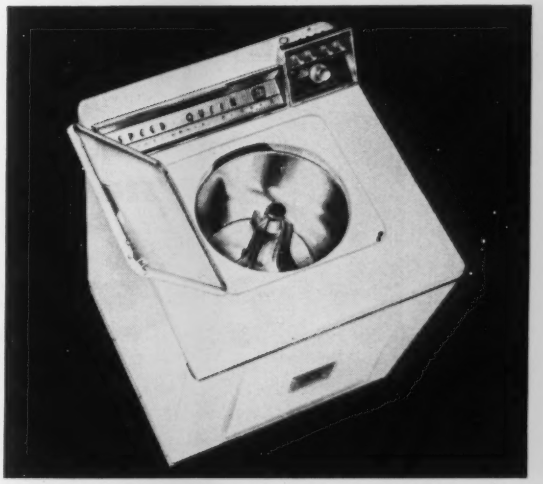
First, there's a hairpin bend to a 1¼-diameter radius! Then a 4-way crimp to form a finned venturi! Next some punching and notching! Followed by welding!

This is how Harper-Wyman Company turns Republic ELECTRUNITE® Carbon Steel Tubing into the lightweight, easy-to-clean venturi burner tubes used on scores of famous-name gas ranges.

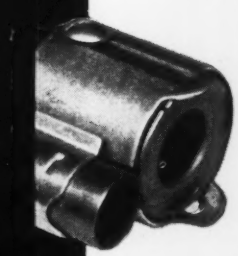
All these severe bending and crimping operations depend on close tolerances on the O.D. and the I.D. of the Republic Steel Tubing to avoid die and mandrel troubles. Uniform, predictable ductility is a must to avoid stretch and collapse as the tubing is severely bent and formed.

Republic ELECTRUNITE Steel Tubing is uniform in wall thickness, fully concentric, and can be furnished with smooth surface finish inside and out. It is supplied in a full range of sizes, wall thicknesses, grades, and ductilities to meet any of your fabricating requirements. Dollar for dollar, your best tubing buy is Republic ELECTRUNITE, the *original* electric-resistance-welded tube.

Let our engineers help you design Republic ELECTRUNITE Steel Tubing into your products to speed production, cut costs, eliminate excess weight and improve product performance. Fill in coupon and mail today.



VOLLRATH COMPANY MAKES STAINLESS STEEL WASHER TUB IN ONE DEEP DRAW. For the Speed Queen automatic washer, Vollrath craftsmen start with a circular blank of Republic ENDURO® Stainless Steel. Then, in a single operation, they deep-draw the blank into a tub in which diameter of the blank is reduced 50%. Proof of ENDURO's ductility and workability! Installed in the Speed Queen washer, the stainless tub adds sales appeal, promises lifetime service. Where can you use ENDURO to improve product or process? Republic metallurgical help is yours for the asking.



TWO-YEAR-OLD DRIVER TESTS NYLOK NUTS. They are used at several critical points of the Taylor Tot manufactured by The Frank F. Taylor Co., assuring positive locking even under severe shock, vibration and tension. Republic Nylok Nuts lock whether seated or not, protecting painted surfaces and soft metals. Positive locking assured wherever you stop wrenching. Even a two-year-old can't shake 'em loose. Want test samples? Write Republic, indicating size needed.

GET ZINC COATING PROTECTION WITHOUT COSTLY DIPPING AFTER FABRICATION. You can, with Republic Continuous Galvanized Steel. That tight, corrosion-resistant zinc coating will not crack, flake or peel under any forming process permitted by the base metal. Result is long-lasting protection without costly dipping. And, further finishing can be eliminated. Get the facts on this new production-line material, available in sheets and in rolls. Send coupon today.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. C-3997
3120 EAST 45th STREET • CLEVELAND 27, OHIO

I'm interested in more information on:

- ☐ Republic ELECTRUNITE Mechanical Tubing
- ☐ Republic ENDURO Stainless Steel
- ☐ Republic Nylok Nuts
- ☐ Republic Continuous Galvanized Steel

Name_____ Title_____

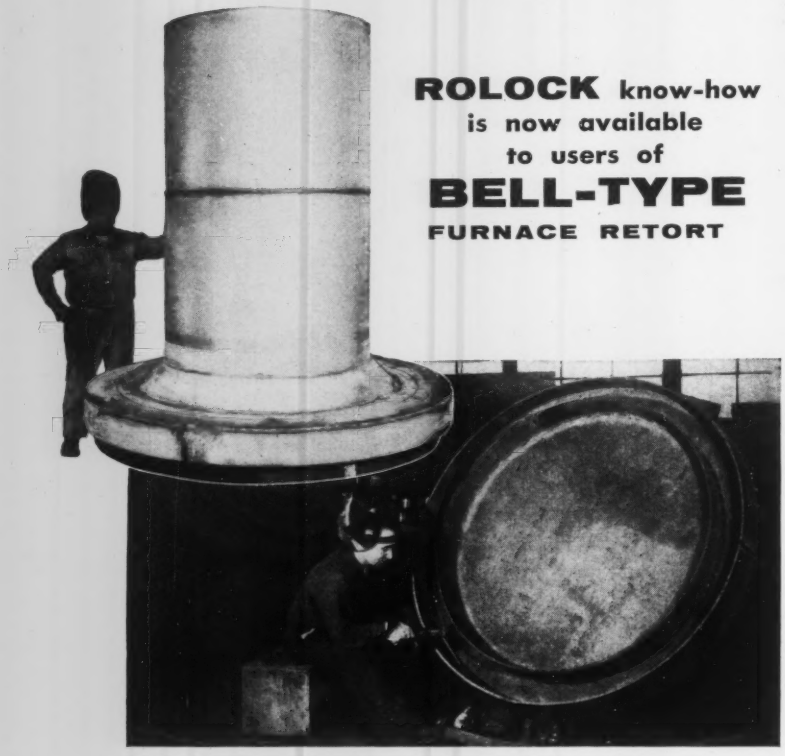
Firm _____

Address _____

City_____ Zone___ State_____

ROLOCK

FABRICATED HEAT AND CORROSION RESISTANT ALLOYS



ROLOCK know-how
is now available
to users of
BELL-TYPE
FURNACE RETORT

On the sound basis of PROVED performance, Rolock has become a major supplier of bell-type furnace retort hoods and bases. Photographs show examples of current production.

Rolock has the modern facilities required to handle these large welded fabrications with assurance of quality workmanship. Rolock engineering has contributed many design improvements, such as the incorporation of alloy in the bases to prevent cracking, and superior methods of reinforcement. Rolock skill in handling high nickel and straight chrome alloys is your promise of long service life. Finally, Rolock quality standards are maintained by any required forms of inspection.

Next time you order equipment of this type, call Rolock. You will not be disappointed.

SALES & SERVICE FROM COAST TO COAST

ROLOCK INC., 1262 KINGS HIGHWAY, FAIRFIELD, CONNECTICUT

JOB-ENGINEERED for better work
Easier Operation, Lower Cost

8RL57

(*Concluded from page* 99)

for acoustical ceilings and cut nails.

American Brass Adds to Plant

American Brass Co. will complete a $1.5-million expansion of its Buffalo plant in October. The program will increase production of copper-alloy tubing and allow manufacture of tubes up to 100 ft long.

Rail Company Plans To Move

The Standard Railway Equipment Mfg. Co., Chicago, leased the twelfth floor of the 22-story Borg-Warner building, which is under construction at 200 S. Michigan Ave., Chicago. The firm is now at 310 S. Michigan Ave. Occupancy is set for Apr. 1, 1958.

Plans $3-Million Plant

Farnsworth Electronics Co., a subsidiary of International Telephone & Telegraph Co., plans to build a $3-million plant in Ft. Wayne, Ind.

The production facility, set for completion in 1958, will add about 1000 employees to the present payroll of 4500.

Detroit Firm at New Address

McCarthy Electric Co., Detroit, moved into a new plant at 9640 Grinnell Ave., Detroit. The firm makes resistance welding transformers, induction heating and salt bath transformers.

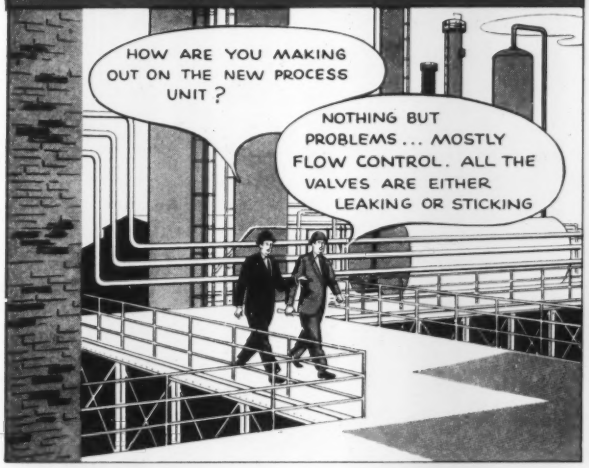
Bearing Maker Expands Plant

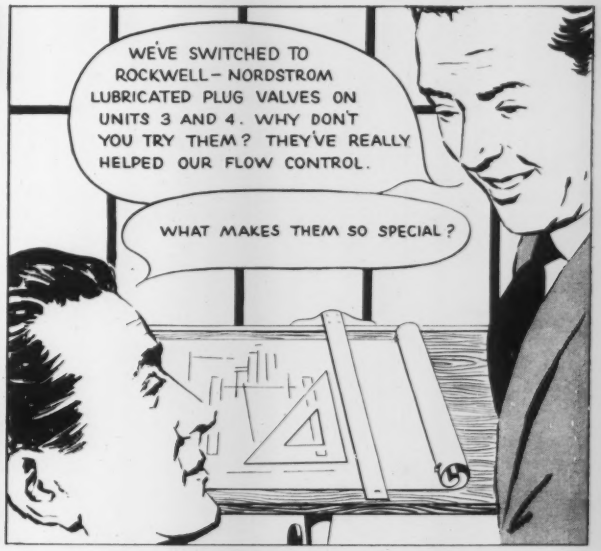
Miniature Precision Bearings Inc., Keene, N. H., has begun contruction of a $300,000 plant addition. It will add about 25,000 sq ft to the present 50,000 sq-ft structure. About 150 more employees will be added when the facilities are completed in January, 1958.

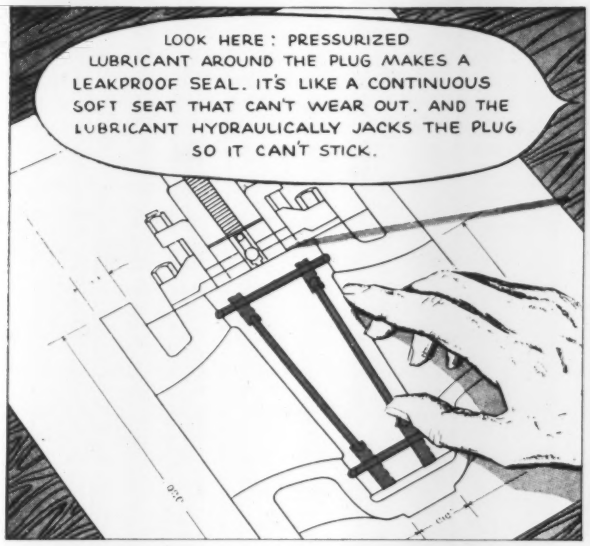
To Make Investment Castings

Consolidated Foundries & Mfg. Co., Chicago, acquired the investment casting business of N. A. Woodworth Co., Detroit. Woodworth will continue its manufac-

COST CUTTING IN ACTION
by Rockwell-Nordstrom


HOW ARE YOU MAKING OUT ON THE NEW PROCESS UNIT ?
NOTHING BUT PROBLEMS ... MOSTLY FLOW CONTROL. ALL THE VALVES ARE EITHER LEAKING OR STICKING


WE'VE SWITCHED TO ROCKWELL-NORDSTROM LUBRICATED PLUG VALVES ON UNITS 3 AND 4. WHY DON'T YOU TRY THEM? THEY'VE REALLY HELPED OUR FLOW CONTROL.
WHAT MAKES THEM SO SPECIAL ?


LOOK HERE : PRESSURIZED LUBRICANT AROUND THE PLUG MAKES A LEAKPROOF SEAL. IT'S LIKE A CONTINUOUS SOFT SEAT THAT CAN'T WEAR OUT. AND THE LUBRICANT HYDRAULICALLY JACKS THE PLUG SO IT CAN'T STICK.

WHAT ABOUT COST AND MAINTENANCE ?
THEY DON'T COST ANY MORE TO BUY THAN ORDINARY VALVES THEY COST LESS TO USE BECAUSE LUBRICANT STOPS METAL-TO-METAL WEARING FRICTION.

WELL, IF THEY'RE SO GOOD, WHY DON'T WE USE ROCKWELL-NORDSTROM VALVES IN MORE PLACES ?
WE PROBABLY WILL. I'VE HAD THEM ON TEST FOR A GOOD WHILE AND THE OPERATIONS AND COST REPORTS HAVE ME CONVINCED.

ROCKWELL-
Nordstrom
VALVES

LUBRICANT SEALED FOR POSITIVE SHUT-OFF

Rockwell-Nordstrom valves are available in a complete range of sizes and ratings in semi-steel, steel, stainless steel and other corrosion resisting metals.

Send Coupon For Free Literature

Rockwell Manufacturing Company
Rockwell-Nordstrom Valve Division
Department S77, Pittsburgh 8, Pa.

☐ Please send me complete information on Rockwell-Nordstrom valves for process, industrial and manufacturing flow control.

☐ Please send me the name of your nearest distributor . . . ask him (to) (not to) call immediately.

Name_____ Title_____

Firm_____

Street_____

City_____ Zone_____ State_____

Don't wait for the straw!...

Call Pioneer now...

Why worry about where to find competent designers and engineers of dies, fixtures, tools and gages.

Pioneer has them for you.

Our highly skilled tool designers and engineers are the permanent solution to engineering overloads in many tool and process engineering departments like your own.

They will be ready to go to work *when and as you need them.* Eliminate worry about temporary overloads and excessive payrolls. Call Pioneer headquarters now.

SINCE 1931 **Pioneer ENGINEERING & MANUFACTURING CO., INC.**
Telephone - TWinbrook 3-4500
19669 John R Street, Detroit 3, Michigan

INDUSTRIAL ENGINEERS, CONSULTANTS & DESIGNERS
BRANCH OFFICES IN DAYTON, OHIO, WASHINGTON, D. C. and TORONTO, ONT., CAN.

turing and machining operations.

Consolidated will operate the casting business through its Casting Engineers Inc. division in Chicago.

NEW ADDRESSES

Coulter & McKenzie Machine Co. moved its plant to 35 Union Ave., Bridgeport 7, Conn.

Vulcan Crucible Steel Division of H. K. Porter Company Inc., Aliquippa, Pa., moved into its warehouse and office at 1521 E. Eight Mile Road, Detroit 20 (Ferndale), Mich. Previous quarters were at 4843 Bellevue Ave., Detroit. The division makes tool die and specialty steels.

American Chain & Cable Co. Inc., Bridgeport 2, Conn., opened a branch office and warehouse building in the Central Manufacturing District, Los Angeles, Calif.

Bristol Co., Waterbury, Conn., moved its Newark, N. J., sales and service staff into enlarged quarters at 744 Broad St., that city. Branch manager is R. C. Bechert.

CONSOLIDATIONS

Industrial Enterprises Inc., New York, will purchase **United Specialties Co.**, Chicago, subject to the approval of stockholders of United, a maker of small parts. Since October, 1955, Industrial Enterprises has acquired Fleet Carrier Corp., Milwaukee Crane Division and Vincennes Steel Corp.

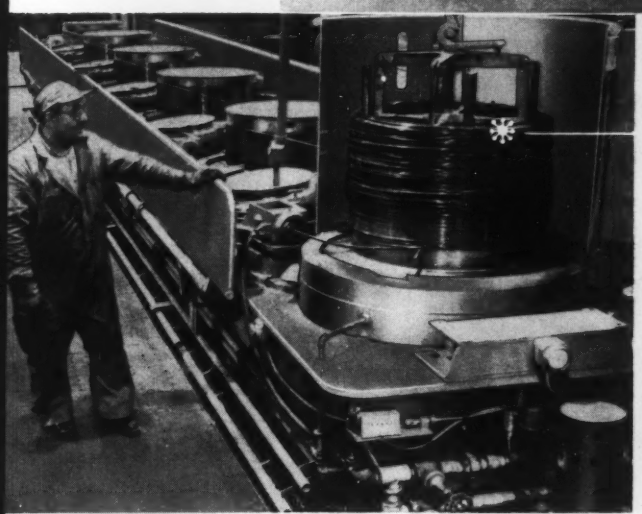
Gulton Industries Inc., Metuchen, N. J., purchased **CG Electronics Corp.**, Albuquerque, N. Mex. Officers of the subsidiary are: Dr. L. K. Gulton, president; Harold Poulsen, vice president and general manager; Frank Hoover, vice president and chief engineer; Burt Bittner, vice president.

Wall Wire Products Co. and **Helical Tube Corp.** merged. Officers of the new corporation, Wall Tube & Metal Products Co., Newport, Tenn., are: Chairman,

Typically *Vaughn*—

THIS MIGHTY BRIDGE IS SUSPENDED BY *Wire*

Michigan's Mackinac Bridge—world's longest of its kind. Length of main span, 3,800 ft. Length of suspension bridge, 8,614 ft. Number of main cables, 2. Diameter of cables, 24½ in. Number of wires in each cable, 12,876. Total length of cable wire, 41,200 miles.



Installation Photo—
Courtesy American Steel & Wire Division United States Steel Corp.

DRAWN FROM THIS *SINGLE*

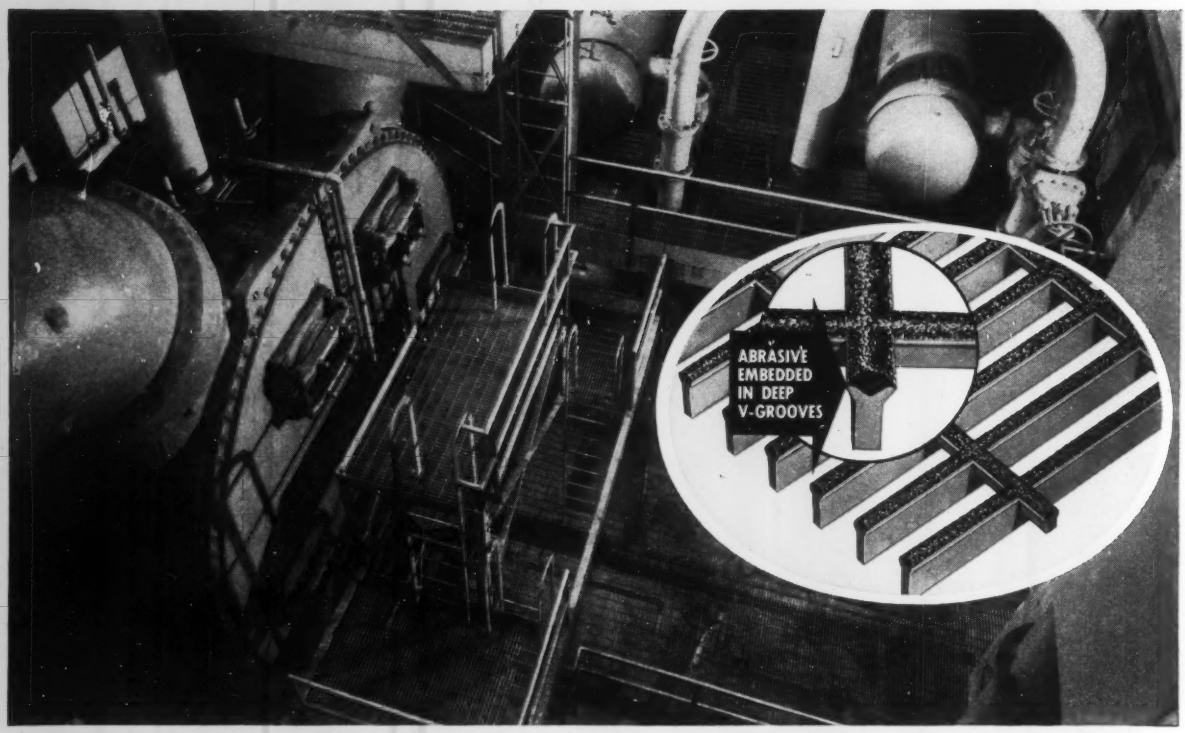
Vaughn MOTOBLOX®

All of the wire for the suspension cables of the Mackinac Bridge—41,200 miles of it—was produced on *one* Vaughn HRX Motoblox. Finishing the 0.192 diameter wire at higher speed and efficiency than ever before attained, the HRX machine employed to the fullest extent its outstanding power and cooling capacities. • *For profitable solutions to your own wire drawing requirements, consult VAUGHN!*

THE VAUGHN MACHINERY CO.
CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars & Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

"Quick on the Draw!" Ⓥ®



Wears longer than steel . . . non-skid under oily conditions . . .

Reliance Relgrit®

abrasive embedded grating

Reliance Relgrit abrasive embedded grating and treads provide the only truly non-skid surface. Even when covered with oil, Relgrit has a coefficient of friction 30% greater than dry steel grating. Wear tests have shown that the abrasive surface will wear longer than steel, and retain its non-skid quality during its entire service life.

The top surfaces of the bearing and cross bars have 1/8" deep V-grooves in which is embedded abrasive aluminum oxide grains in a hard resin. The material is not affected by water, oil, gasoline, greases, or commonly used acids, alkalis and other chemicals. Together with its wear resistance, this gives Relgrit a long service life.

If you have floors or stairs which become oily, greasy, wet, or slick from any cause, Relgrit can provide safe footing at very low cost. Write on your letterhead for free sample and literature, or ask for our representative to call. It will pay you to investigate this remarkable new grating.

*you can't slip on Relgrit**

*Patent applied for

Please send Bulletin R655B describing Relgrit abrasive embedded grating and treads.

NAME

COMPANY

ADDRESS

CITY STATE

RELIANCE
Steel Products Company

P. O. Box 510-L, McKeesport (Pittsburgh District), Pa.

Relgrit Abrasive Gratings and Treads • Lightweight Bridge Flooring
Steel, Stainless and Aluminum Grating • Steel Mill Equipment

J. Goble; president, W. W. McMinn Sr.; executive vice president, M. M. Wachowiak; vice presidents, W. W. McMinn Jr., F. L. Demsey and F. G. Higbee; secretary, S. B. Fortenbaugh. The corporation plans to expand facilities for the production and fabrication of seamless and welded stainless steel tubing. Extensive development engineering in bimetal condenser and evaporators is under way. Manufacturing facilities for the fabrication of metal stamping assemblies are being broadened.

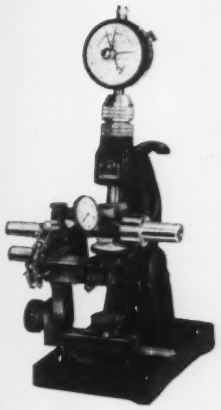
ASSOCIATIONS

American Foundrymen's Society, Des Plaines, Ill., has launched an intensified program of job training for line supervisors. S. C. Massari is director of the recently organized AFS Training & Research Institute. This year's courses include: Sand testing, sand control for shop operations, foundry cost reduction through better methods and performance standards, advanced sand technology and cupola melting of iron.

American Institute of Mining, Metallurgical & Petroleum Engineers Inc., New York, nominated H. C. Pyle of Monterey Oil Co., Los Angeles, president-elect in 1958. G. J. Holt of Ishpeming, Mich., general manager of Cleveland-Cliffs Iron Co., is the incumbent. Dr. Augustus B. Kinzel, vice president-research, Union Carbide Corp., New York, will become president in February, 1958. Nominations for vice presidents include: A. W. Thornton, U.S. Steel Corp.'s National Tube Division, Pittsburgh, and J. C. Kinnear Jr., Kennecott Copper Co.'s Nevada Mines Division, McGill, Nev.

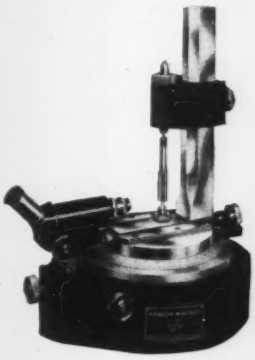
W. M. Bridwell, General Steel Castings Corp., Granite City, Ill., was elected president of the **Purchasing Agents' Association of St. Louis.**

L. C. Hill, general sales manager, Vulcan Crucible Steel Division, H. K. Porter Company Inc., Aliquippa, Pa., was elected chairman of the Pittsburgh chapter of the **American Society for Metals.**



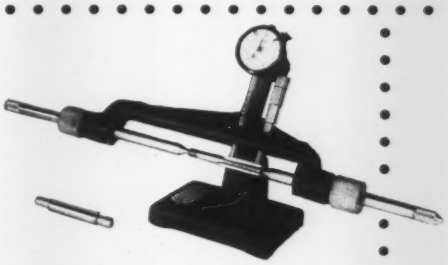
Thread Comparator (External) with Concentricity Attachment

Thread Comparator Standard Model



Optical Tap Checker

Thread Comparator (Internal) with Squareness Attachment



Tap Check Comparator

WHERE QUALITY BEGINS . . .

Hanson-Whitney offers your production the utmost protection with a complete line of master precision instruments for inspection of screw threads having closest tolerances. Each an addition to the traditionally fine line of H-W taps, gages, hobs, and cutters . . . these H-W gages assure "full quality control from thread start to finish."

Hanson-Whitney's entire line of products are designed and manufactured with "single source integrity" . . . key factor in accuracy and availability. Local distributors back Hanson-Whitney's home and field engineering with complete stocks for fast, off-the-shelf service. Write for free literature.

Hanson-Whitney COMPANY

Division of THE WHITNEY CHAIN COMPANY

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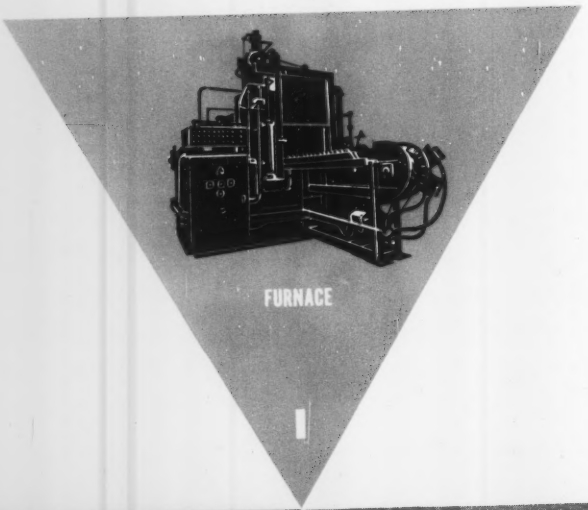
TAPS : THREAD GAGES : HOBS : CENTERING MACHINES : THREAD MILLING MACHINES AND CUTTERS

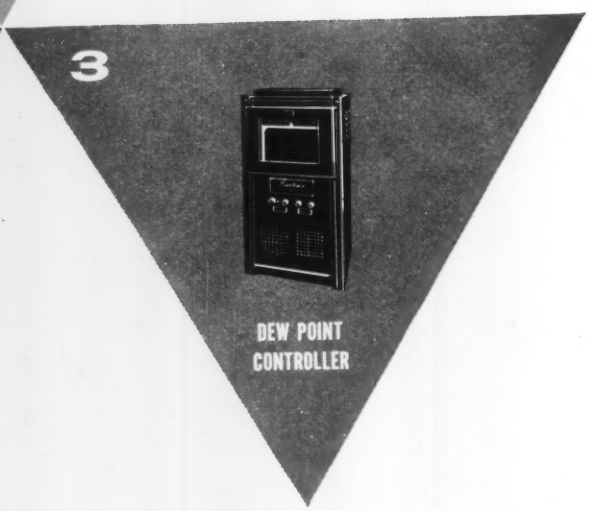


FURNACE

1

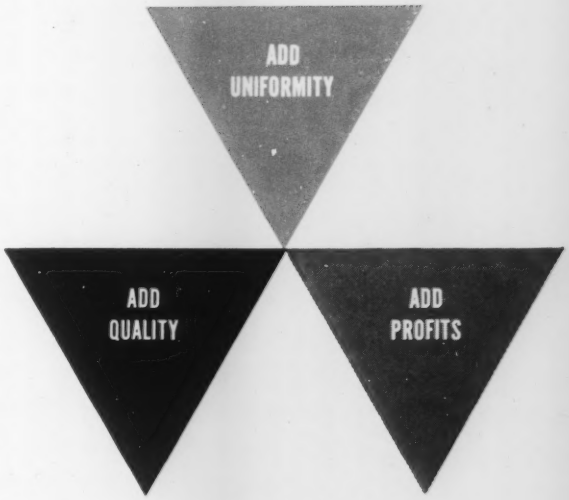
2

GAS
GENERATOR



3

DEW POINT
CONTROLLER



UPGRADE STEELS AND PROFITS WITH SURFACE INTEGRATED GAS CHEMISTRY

You can upgrade low-cost steels, and protect metal surfaces to cut cleaning costs with Surface gas chemistry. You can tailor the chemical composition and the physical properties of your metal surface exactly to order.

The process is controllable by instrumentation, and can be easily applied to either batch or in-line operations.

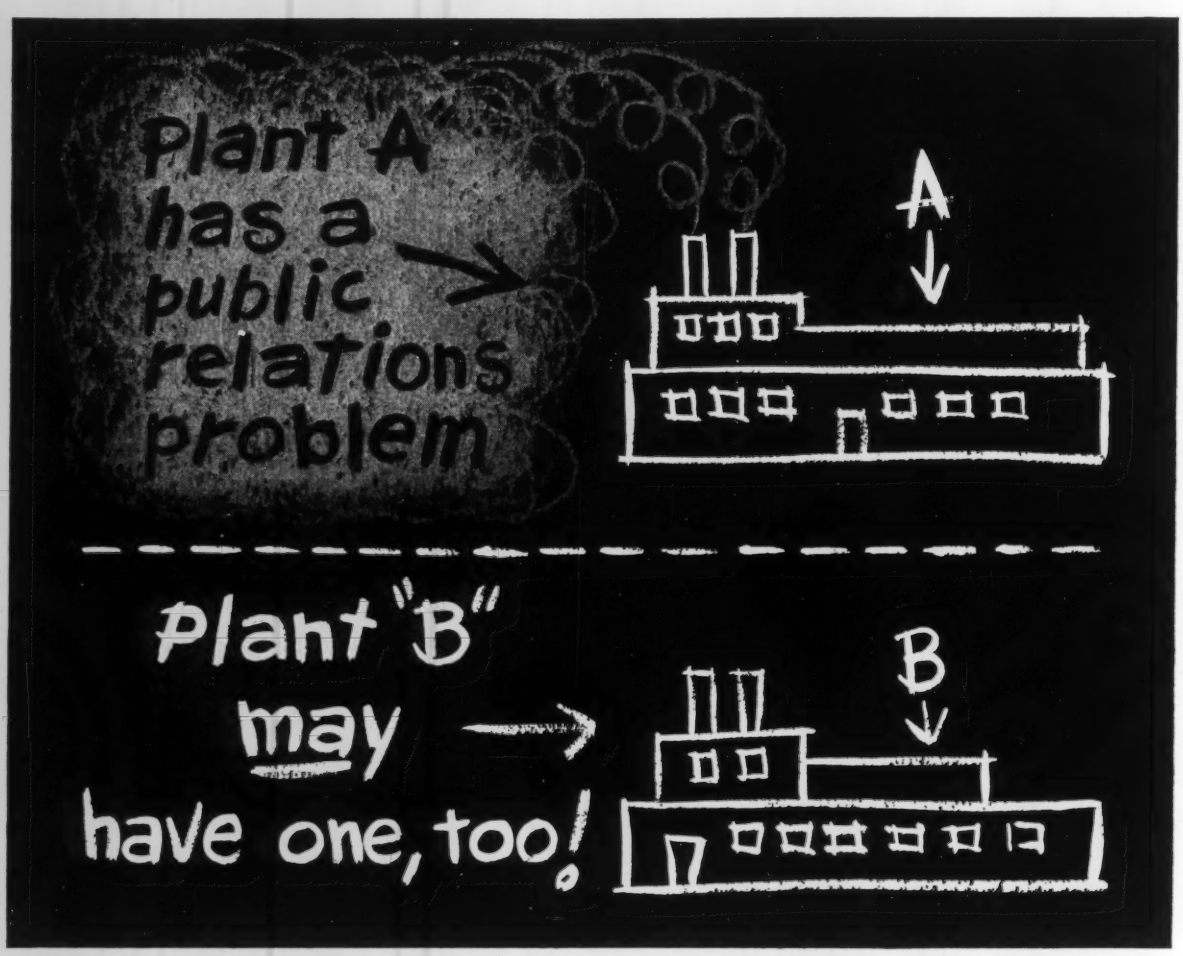
If you use endothermic atmospheres, Surface can supply you a completely integrated system consisting of (1) furnace, (2) atmosphere generator, and (3) controls. Designed to work together, these elements can be as automatic as you want them.

You can improve your profit atmosphere by applying Surface gas chemistry to your heat treating operations. It will reduce costs, improve product uniformity and quality, reduce or eliminate manual labor, and avoid waste disposal problems.

See how Surface gas chemistry has profited others; write for Bulletin SC-178.

Surface Combustion Corporation, 2385 Dorr St., Toledo 1, Ohio. In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario.

wherever heat is used in industry



Is your plant producing an invisible public NUISANCE?

The unwanted by-products of plating tanks, salt bath furnaces, metalworking machines and boilers —mists, salts, metal dust and fly ash—often can't be seen. But they can silently and swiftly do their destructive work on plant roofs, automobile finishes and home exteriors. Result: high maintenance costs, unhappy employee and neighborhood relations.

The answer to both invisible and visible air pollution is AAF dust control. AAF is *completely equipped* for the fight, engineers a line of dust control units that includes dynamic precipitators, hydrostatic precipitators, dry centrifugals and fabric arresters.

Ask your local AAF representative to check sources for *all* air pollution—both the seen and the unseen. Call him now or write us direct.

ROTO-CLONE AMERclone AMERjet
Dust Control Equipment

BETTER AIR IS OUR BUSINESS

AAF herman nelson

American Air Filter
COMPANY, INC.
443 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

STEEL
July 29, 1957

Technical Outlook

BETTER THAN TRANSISTORS— Physicists at Raytheon Mfg. Co., Waltham, Mass., have developed a semiconductor device as tiny as a transistor that works like a vacuum tube. They call it a Spacistor. Said to operate up to 500°F, the Spacistor may fill a need in the rocket and guided missile fields. It will amplify frequencies up to 10,000 megacycles—50 times higher than transistors. The catch: It may be three to five years before the device becomes commercially available.

FINISH FOR ZINC DIECASTINGS— Under the sponsorship of the American Zinc Institute, Battelle Memorial Institute, Columbus, O., is looking for ways to eliminate costly hand buffing of zinc diecastings. The approach: Electropolishing followed by bright zinc plating. Electropolishing smooths irregularities; plating seals porosity and overcomes roughness, giving a smooth mirrorlike surface. The sealing effect is expected to give the castings improved corrosion resistance when they are later plated with conventional copper-nickel-chromium.

FLAME PLATING— The newest application of this process is reported by Linde Co., a division of Union Carbide Corp., New York. It's being used on bearing surfaces of hot air valves for Lockheed's F-104A Starfighter. The tungsten carbide coating eliminates galling and gives parts subjected to high unit loads and temperature extremes a low coefficient of expansion.

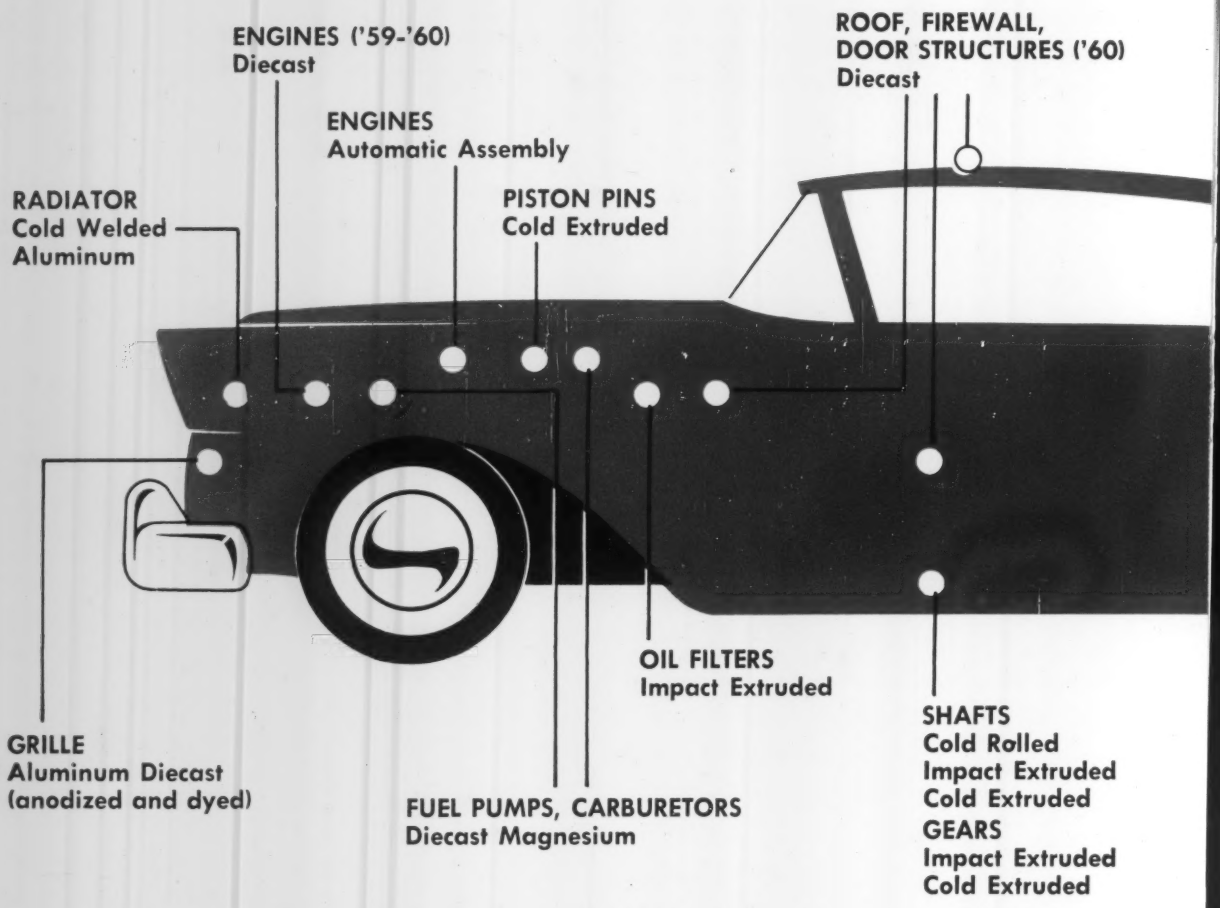
TV AIDS DIE LAYOUT— The control platform of a new die layout machine at Alcoa's Cleveland Works features a 17-in. television receiver. The picture is beamed by three cameras trained on finely calibrated scales, so the operator can check the machine's position (to 0.001 in.) as it locates dimension points on a hardened steel die block. Developed by Alcoa and the Consolidated Machine Tool Division of Farrel-Birmingham Co. Inc., Rochester, N.Y., the machine makes it possible to produce large dies to extremely close tolerances.

MORE USE OF TV— At Evendale, O., a closed circuit, three dimensional color television will be used in remote servicing of reactors in the development of a nuclear aircraft propulsion system. Its developer, General Electric Co., says the color stereo system will permit the use of color coded parts in reactor components and provide the degree of precise depth perception required for their correct positioning.

BEATS FATIGUE— Strain gages tied in to a control system on stretch formers eliminates overstretching or breakage, says Cyril Bath Co., Solon, O. Tension on the work varies considerably even when hydraulic pressure remains constant. Bath Co. officials say the device (called a yield tension monitor) will be used in making parts for the Jupiter guided missile and Convair's new jet airliner, the Golden Arrow.

SHOT PEENING— Consider these factors in choosing an abrasive for shot peening: 1. Shot must be uniform in size. 2. It should be round and free of voids, pimples and blowholes. 3. It's accepted practice to use shot of equal or greater hardness than the part being peened, but in some applications, satisfactory results have been obtained with softer shot. 4. Large shot will give good impact but poor coverage; small shot will give good coverage but poor impact. Source: Cleveland Metal Abrasive Co., Cleveland.

Metalworking Outlook—p. 65 Market Outlook—p. 163



A Look Ahead at Part Making

Some new methods will make debut in '58. Others are slated for use in '59 and '60. Look for fewer subassemblies, larger one-piece parts and more light metals in new models

THE ILLUSTRATION above gives you an idea of how a number of parts for tomorrow's automobiles will be made.

It's a condensed story of Detroit's efforts to get around unnecessary machining, make better parts for less and to substitute a single piece for a whole assembly.

Processes that move metal into finished shapes in a single operation, cold extrusion, impact extrusion and flow forming, will get a big play. They use less material, lower costs and improve physical properties.

Increasing emphasis will be put on diecasting, CO_2 automatic welding and automatic assembly machines.

Here are some of the things you'll be hearing more about:

1 Cold Extrusion

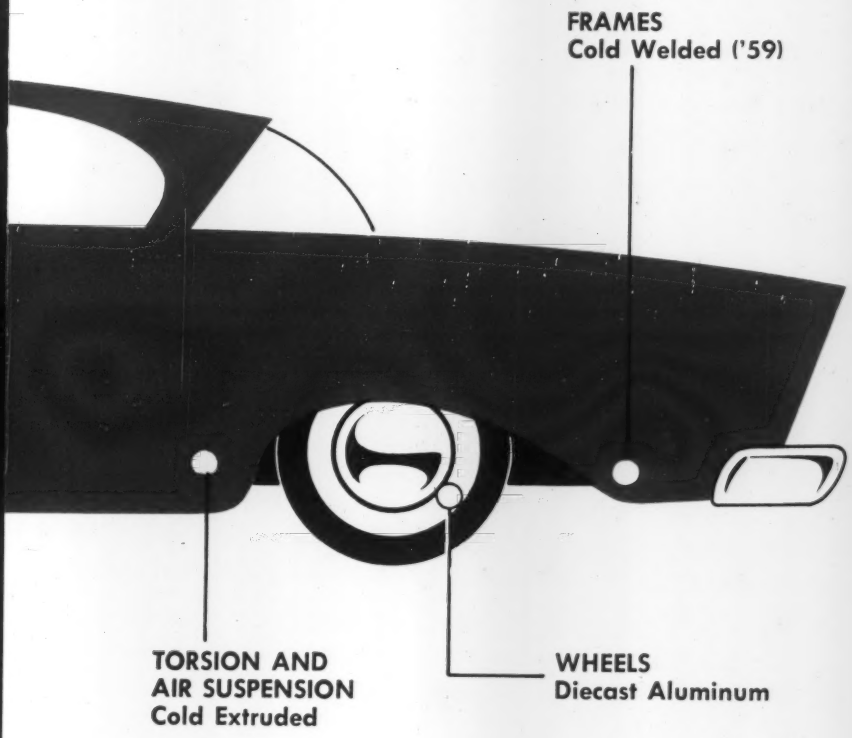
Auto makers like this process. It's a way to make low carbon steels do tougher jobs.

Extrusion billets are coated with a phosphate and soap lubricant and inserted in a die. Punches, which are a part of the extrusion press, fit the inside contour of the part. As the press squeezes, the billet becomes plastic. Metal flows between punch and die filling the the cavity.

Typical properties of parts so made:

Tolerances are equal to those of conventional machining.

Diameters are accurate to with-



per free (no draft angle); minimum wall thicknesses vary from 0.010 in. for a ¾-in. cylinder to 0.060 in. for a 5-in. cylinder.

Also, complex configurations in deep draws are always a problem for conventional dies. With aluminum becoming more abundant, it's logical for auto people to adopt the method for covers, shells, cylinders, baffles, reservoirs, caps and sleeves. A prize example: A torque reaction shaft for transmissions.

❸ Chipless Machining

Michigan Tool Co. (Detroit) has a cousin to thread rolling in its Rotoflow. Opposed dies roll parts, pressing the required profile into the metal.

Rear axle splines are one example. Axles are fed from a conveyor to the machine bed which carries them horizontally through the Rotoflow dies. The dies resemble racks—teeth which form the splines are shallow at first, gradually deepening toward the end.

Similar machines form the keyways in transmission countershafts. Tomorrow's cars will have gears made this way.

❹ Powdered Metals

This method is getting its share of attention. Bigger presses and

in 0.003 to 0.010 in.

Eccentricity of inside and outside diameters is within 0.015 in., total indicator reading.

Physicals are much improved. Mild steel yield strengths of between 80,000 and 160,000 psi are not uncommon. Surface finish can be 35 microinches rms. Flow lines similar to those in forgings are an additional feature.

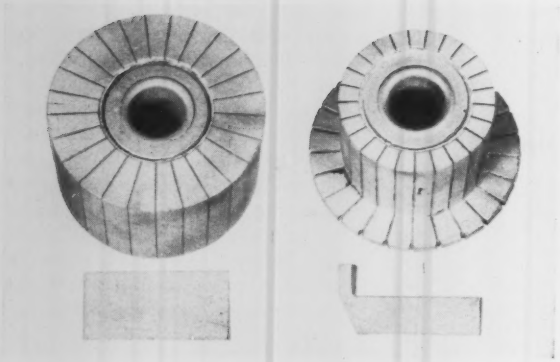
Ford Motor Co., Cleveland, makes piston pins as a double reverse extrusion (metal flows back over opposed punches). It uses a special Danly press.

❷ Impact Extrusion

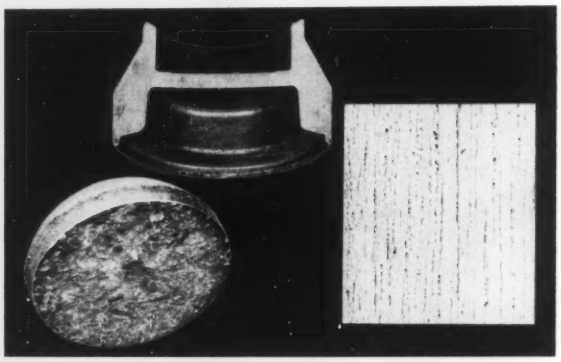
Suppliers say Detroit will work more aluminum impacts into '58 models than they have in previous cars. They require little or no machining; parts are accurate and ta-

Materials and Methods for New Models

METHOD	MATERIAL	PART
Diecasting	Magnesium	Accessories such as fuel pumps, distributor housings, carburetors.
	Aluminum	Wheels. Hardtops.
Impact extrusion	Aluminum	Oil filter covers. Spark plug covers.
Cold welding	Aluminum Steel	Radiators. Body components.
CO_2 welding	Steel	Frames (at 300 in. per minute).
Cold extrusion	Steel	Piston pins, stop light switch bodies, gears and suspension parts.
Cold spline rolling	Steel	Gears, transmission shafts, bearing surfaces of shafts.
Compacting	Steel chips	Miscellaneous parts like oil plugs.
Sintering	Powdered metals and ceramics	Clutch parts, brakeshoes.

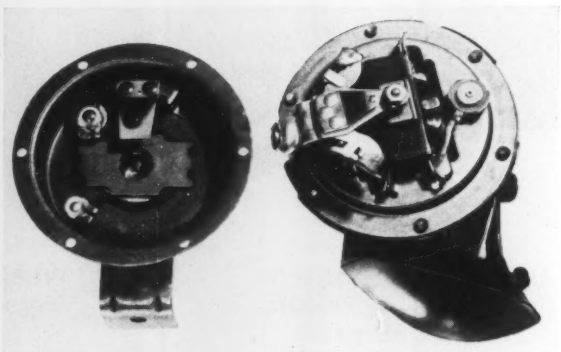


Cold extruding the heavy riser bar (right) saved almost the equivalent of its finished weight in copper chips. Old style part (left) was lathe turned to finished form at right



They're even saving the chips. Plug was formed from compacted slug. GM says physicals approach those of conventional parts. Photomicrograph shows typical structure

Alcoa impact extrudes many aluminum parts for autos. Girl is checking hardness of torque reaction shafts. More impacts are scheduled for the '58s



There's always a big rush to simplify. Delco-Remy Division of General Motors will put the horn at the left on 1958 cars. Old and more complex unit is at right

more know-how make larger parts possible. New combinations of iron powder and ceramics add heat and wear resistance.

Such combinations have been used for brakeshoes on trucks. It's more than rumor that one auto maker may have them on some '58 passenger cars. The claim: Practically no brake fade.

General Motors compresses steel machining chips to make parts like plugs and caps. For a starter, they'll probably be used as an oil plug. Glen R. Fitzgerald, chief engineer, AC Spark Plug Division, Flint, Mich., who assisted in the development, points out that physical properties approximate those of conventional parts.

5 Welding

As auto makers and suppliers have learned to handle the process, CO_2 welding has been substituted for the conventional stick method. Applications have been confined to automatic machines. Both Chrysler and GM will use more weldments next year. Main applications: High stress points in bodies.

The reason: Hand welding seldom exceeds 15 in. a minute. At Midland Steel Produets, auto frames are welded at 300 in. a minute (STEEL, July 1, p. 43). The firm gets such speeds with 800 amperes and believes that 1600 (and greater speeds) are in sight.

A major car builder is working on cold welded steel frames. The inventor told STEEL that the process is definitely out of the laboratory. Too late for '58, it could be used on a '59 model.

Detroit is trying out aluminum radiators. Some are brazed. Some are soldered. A major press builder is cold welding one.

6 New Tools

There's no letup in the campaign to improve temporary tools. Chrysler is stepping up work on plastic dies.

A. O. Smith, a framemaker, is using steel rule dies for many '58 frame parts. (The firm says one of these dies cut 250,000 blanks.)

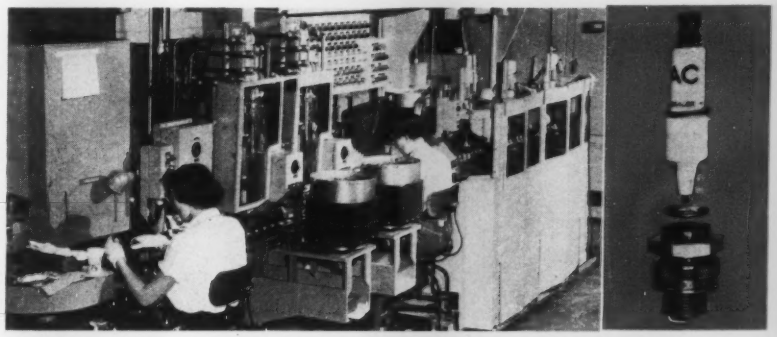
Since lighter metals are getting more play, there will be even more emphasis on such tools.

7 Pushbutton Assembly

The people who assemble auto parts make up "the largest single group of direct labor" at GM, says Mr. Fitzgerald. The statistic explains why AC Spark Plug already has more than 100 automatic assembly machines at work.

Advantages are obvious: Such machines eliminate operator errors;

Among parts cold extruded at General Motors: Piston pins and nuts for stoplight switches. Only obstacle for new parts: Know-how



Automatic Assembly in High Gear

THIS is one of more than 100 machines which automatically assemble spark plugs at AC Spark Plug Division, General Motors Corp., Flint, Mich. It's another major step toward a pushbutton factory.

Here are the operations: Operator loads shell; machine inspects; loads lower gasket; inspects. Second operator loads insulator assembly; machine loads upper gasket; inspects; presses shell to upper and lower gasket and insulator assembly; cold crimps shell over insulator assembly and upper gasket; shrink welds (makes gastight joint); adjusts gap; loads washer conveyor; washes plugs; inspects; loads packaging machine; loads cartons; loads cartons into packs; transfers to shipping department.

Experts predict that two 1958 cars will use diecast wheels. Cutaway shows an early prototype

parts are assembled in less time and with greater uniformity; packaging and handling are easily tied in.

GM maintains an entire department to construct and design automatic assembly machines.

The Olds Division assembles cylinder heads automatically on a machine that's 137 ft long. Automatic assembly of the whole engine isn't far away, it is said.

8 Diecasting

The important '58 news here is technical progress: Diecast blocks for V-8 engines are a reality; two cars probably will have diecast wheels; there's a rumor about a one-piece diecast roof on an experimental body.

Although the engine blocks are ready, the economics of a switch from gray iron are a factor. Best bet: You'll see them in '59 or '60.

An authority offers this opinion on aluminum engines:

"Conventional V-8 engines have been improved only in horsepower. Little has been done to improve efficiency. As the gas-turbine gains, some auto makers will counter with light, supercharged engines. They'll feature lower horsepower, better mileage. Acceleration will equal that of present cars. Efficiency will be better."

Diecasters talk much of aluminum. But don't overlook magnesium. AC Spark Plug is switching to it for fuel pumps in '58. Where shipping is involved, such parts can be cheaper. Easier machining is another factor.

9 Laminates, Frames

Ford and Chrysler lead the parade to bright metals covered with colored, tough vinyl plastic. Next year's interiors will be liberally treated. Edsel's radio grille will be made from the combination.

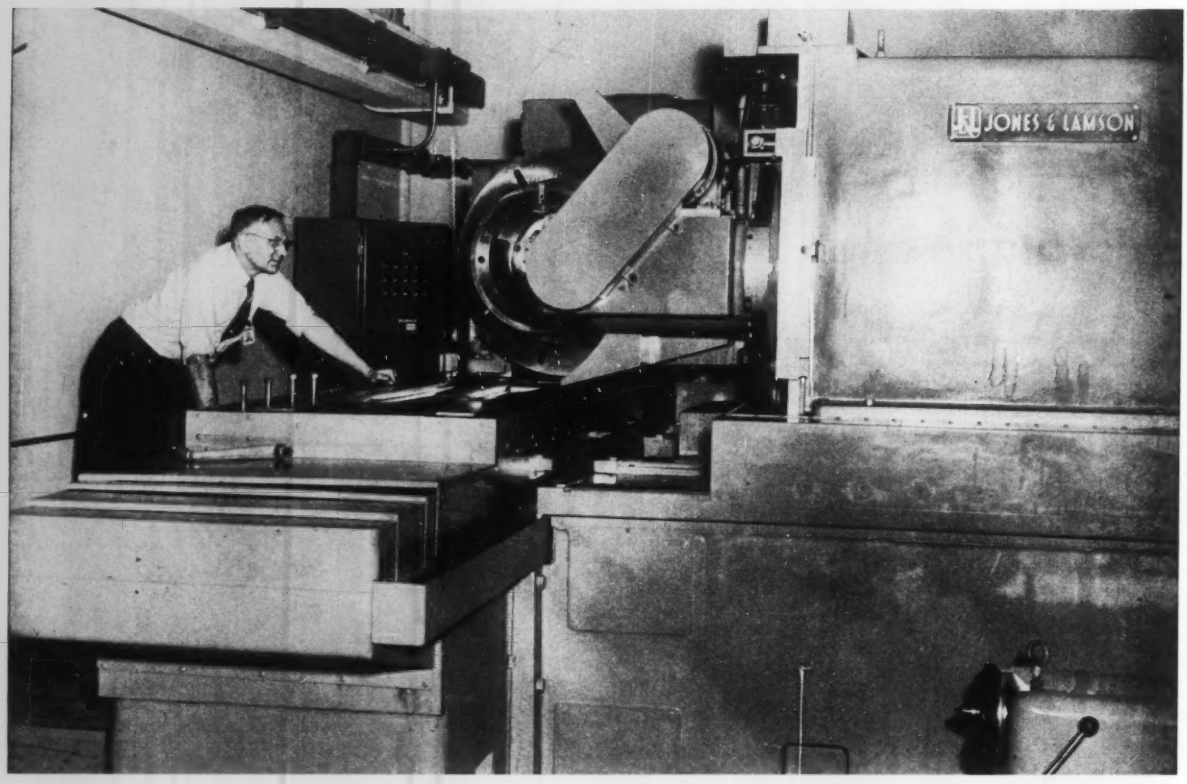
Advantages: No plating; laminates absorb more rough handling than plated parts; the plastic acts as a die lubricant, saving on tools at no sacrifice in appearance.

It looks as though Ford is the newest proponent of unitized frame construction. Some say the Lincoln is the bellwether.

GM will stick to heavier frames because they permit greater latitude in design. Framemakers point to the demand for larger window areas which force greater reliance on a foundation.

GM's answer next year is an X frame with long outriggers.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



Watervliet's new thread grinder. The tailstock, which has been removed from the machine, is partially visible on the floor at right

Thread Grinder Solves Size Problem

Built for Watervliet Arsenal, the machine finish grinds to 0.0003 in. lead tolerance. Such precision is necessary in making large gages for big Army guns

WATERVLIET Arsenal's new gage grinder is "the only machine in this country that can grind threads to the accuracies required on a workpiece 36 in. in diameter and 72 in. long," says A. E. Masterson, chief of the Engineering Branch, National Industrial Division, U.S. Ordnance Corps, Watervliet, N. Y.

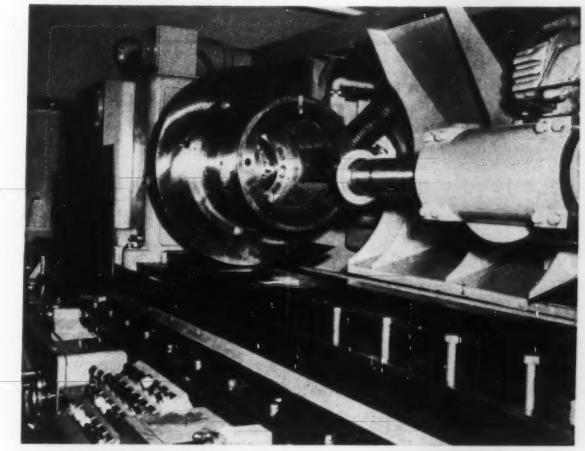
Built by Jones & Lamson Machine Co., Springfield, Vt., the machine is used to finish grind the threads on ring and plug gages. They're used to check the tube (barrel) and breech ring threads of cannons ranging from 20-mm conventional types to 280-mm atomic types.

Breech gages are made of high grade nonshrink tool steel. Threads first are roughed out on a lathe. Before grinding, they are hardened to Rockwell C60-62.

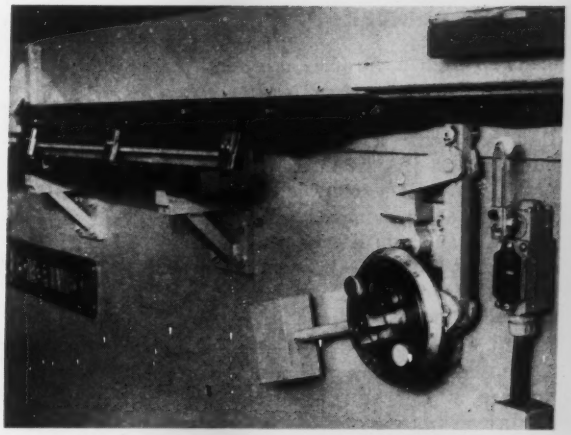
Accuracy—Gage tolerances are critical. Maximum allowable lead variation in 8 in. of thread is ±0.0003 in.; maximum allowable pitch diameter variation is 0.0005 in.

These gages control the location of the mating threads on breech ring and gun tube, assuring quick interchange of these components in the field. Keyways in the two parts must align when the rear face of the gun tube is registering on its mating surface in the breech ring.

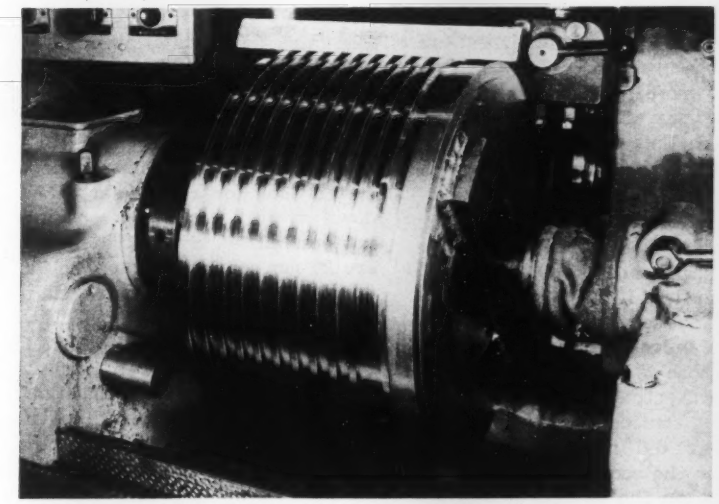
Since the basic clearance between the tube face and the mating breech ring surface is only 0.002 in. when assembled, tolerances on thread location and lead are critical. An error in thread location of 0.001 in. from a given point on the rear face of the gun tube will result in a rotational error of



Business end of the grinder with ring gage mounted on faceplate. External grinding wheel is partially hidden behind spindle of internal wheel



Lead screw compensator, mounted on front of the grinder, consists of a cam and roller follower device. The profile of the cam is translated into rotational movement of the lead screw nut to correct errors in grinder lead screw



Jones & Lamson ground this thread experimentally before delivering the machine to Watervliet. The part is similar to a breech ring gage

Inspector applies ring gage to thread on the tube of an 8 in. howitzer

approximately 1/16-in. on an average gun. Diameter pitch combinations alter this figure.

The Need—The new grinder fills a long existing need at the arsenal. During World War II, a number of private companies made the gages, but they had considerable difficulty holding the required tolerances on gages over 10 in. in diameter. During the Korean War, other companies took the job, but they, too, ran into the same trouble.

In 1954, a contract was let to Jones & Lamson to build a machine large enough to hold the tolerances required. Engineering, designing and building were completed in April, 1957.

Specifications—Known as a 36 x 72 in. thread gage grinder, the machine has an external and an internal grinding head. Maximum length of external thread it will grind is 60 in.; maximum diameter of external thread is 27 in. Maximum length of internal thread is 24 in.; maximum diameter of internal thread is 26 in.

The work spindle is powered by a 2 hp, direct current, variable speed motor. Speeds of ½ to 20 rpm are possible. The external grinding wheel has a 7½-hp motor, the internal wheel a 3-hp motor. Normal grinding on hardened gage threads is done at about 6 rpm. The spindle can hold a 1000-lb workpiece on its faceplate without external support.

Compensator—One feature which

leads to high accuracies is a compensator that corrects errors in the lead screw of the grinder. A flat bar with a cam profile is mounted on the front of the machine. A roller follower operates through a mechanical linkage to translate the profile into rotational movement of the lead screw nut, adding to or subtracting from the thread lead as the grinding head moves along the thread length.

Another accuracy-contributing feature is the taper control bar. Mounted on the edge of the work table, its main function is that of zero taper alignment to grind a straight thread. It can be adjusted to grind a tapered thread.

Surface Finish—Machine specifications call for a surface finish on the thread of 16 microinches, but the arsenal is getting an 8 microinch finish. The chief reasons for this are the filtering system built into the grinder and the rigidity of the machine design. It weighs 66,000 lb.

Coolant is processed through a magnetic separator (to take out steel chips) and two screen filters (to remove nonmagnetic particles and grinding sludge). A refrigerating unit takes the heat out of the coolant.

Lubrication—Every 6 minutes, a high pressure lubricating system shoots a measured amount of oil to nearly all operating parts of the grinder. A few parts, such as handwheels, are lubricated by hand.

Jones & Lamson stresses that this grinder is a prototype. The company is working on a machine that will grind the threads on the breech of the gun.

Interest—Many thread form jobs of this size and accuracy are being done, but adequate machines are not available. Manufacturers have done the second best thing: They have hobbed the work out of softer materials than would be ideal for the job.

"The U.S. Army Arsenal at Watervliet is glad to have joined forces with industry in producing a new, larger type of thread grinder that will undoubtedly have many future applications when industry must grind large threads accurately," says Col. E. S. Mathews, commanding officer at the arsenal.

Builders Spike Slump Rumors

Although new order levels are below what they were early this year, builders say 1957 will be prosperous. "Business is good," they say. "Forget how it compares with a peak"

THE "FEAST OR FAMINE" label continues to plague the machine tool industry.

Some financial writers still feel the industry must either be booming or going bust. Twice this year the practice has been to look at sales, sliding from an all-time peak, and decide that the figures portend doom.

It happened six months ago, and STEEL refuted it by polling the builders. (STEEL, Feb. 4, p. 59.) Now, based on low sales in May, the same prognostications are cropping up again.

Once more, builders have something to say. Their answer is unchanged: This will be a good year.

Here is what some of them report:

Lodge & Shipley Co., Cincinnati; William L. Dolle, president: "More orders came in June than in May, and the first 15 days of July continued to set a good pace. Although industry figures are down from those of a year ago, the lathe business actually is better. We will ship considerably more in 1957 than we did in '56, and if we weather the second half, we think we'll be on the road to a continuous uptrend through 1960."

Buhr Machine Tool Co., Ann Arbor, Mich.; Joseph H. Buhr, president: "One big order helped put the June figure for incoming business over that for May. New orders now aren't coming in well, but we have a backlog that will give us a good year. The main problem is a shortage of big programs in the automotive industry for our special equipment. What we do in 1958 will depend largely on whether several big programs break in the next few months. It's likely that the first quarter (perhaps the first half) of 1958 will be slow, but then it should pick up."

National Acme Co., Cleveland; Fred H. Chapin, president: "Our orders are picking up. June was down from May, but July is considerably better. There may be a slowdown for vacations, but we expect a healthy fourth quarter. We'll wind up with a good year."

Sundstrand Machine Tool Co., Rockford, Ill.; Bruce F. Olson, president: "We don't expect a turnup now until fall, but 1957 will be a terrific year for us. Next year's picture will depend on the size of fall gains. We're not concerned . . . and won't be unless the fall gains don't materialize."

Kearney & Trecker Corp., Milwaukee; Francis J. Trecker, president: "June new orders dropped only slightly from May's — they held up better than we had expected. We look for a customary slowdown in July, but we're certainly not pessimistic. Even if '57 orders are 20 per cent under those in '56, it will make a good year. Shipments are going up; they'll stay high well into 1958, due largely to the big Air Force order for numerically controlled machines. Again on new orders, we think the fourth quarter of this year will about equal the second quarter."

A Builder Problem

Builders are frankly concerned about their inability to lose the feast-and-famine label. They feel that if anything shows them up as a stable and prospering industry, it's the last 15 or 20 years. There has been no famine, and even the widely recognized wartime feast was one course short because of renegotiation.

Rumor of the Week

Several special machine builders are looking for ways to diversify. One hints he's out to buy another company. This group of builders doesn't like being tied so closely to auto makers.

US RUBBER V-Belts

He got new Calm and Reassurance for only 77 cents

Now and then we get human interest reports on the success of our products. These reports are often called "the small incident." We prefer to think of each as one of many success stories—happening every day.

This particular story concerns a man, an iron lung and 77¢. It happened just like this:

For months this man listened to the vibrating sounds of one V-belt after another, slipping, flapping and wearing. In the silence of a hospital room... in the helplessness of an iron lung... these sounds took on terrifying significance. The man knew only that should the belt fail, the respirator would fail, too.

Then, a U. S. V-Belt was installed—cost: 77¢.

From that day, the patient has had new calm and reassurance. The motor hums steadily, the belt performs perfectly, with no sign of wear, no *sound* of flapping.

Just "a small incident" involving only 77¢—but it gives us a pretty good feeling about the quality of material and workmanship that goes into U. S. V-Belts (built with electronic controls and new molding methods) and every "U. S." product.

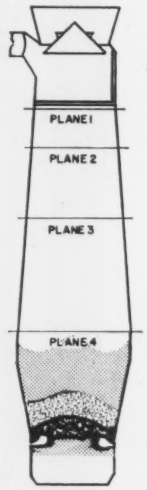
U. S. V-Belts are obtainable at any of our 28 District Sales Offices, at selected "U. S." distributors, or by contacting us at Rockefeller Center, New York 20, N. Y.

US RUBBER **Mechanical Goods Division**

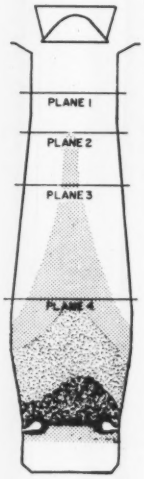
United States Rubber

Principles discussed here are of vital importance to the operation of every modern blast furnace. Watch for concluding article next week

By CHARLES E. AGNEW
Consultant
Blast Furnace & Sintering Plant Operations
Cleveland



Elevation of furnace No. 391



Elevation of furnace No. 442

Maintenance of Equilibrium In Blast Furnace Operation

PRODUCTION of metallic iron from ore involves a two-stage process: 1. Preparation of stock for smelting. 2. Smelting. The vital importance of this principle frequently is not recognized by blast furnace personnel.

A forced draft of air applied to the open hearth fire increases the intensity of the heat. A stack over the open hearth, kept full of raw stock, provides a way to recover heat which otherwise would be lost.

Facilities are arranged to handle both stages of the process simultaneously in the same vessel: Heat is intensified in the smelting zone. Heat is recovered in the stock preparation zone. This is the two-stage principle which is so important in the operation of every modern blast furnace.

Equilibrium — Obviously, stock cannot be smelted faster than it can be prepared for smelting; and stock cannot be prepared for smelting faster than it can be smelted.

The ratio of work capacity between the two divisions of processing governs productive capacity. The lesser capacity is the determining factor.

The ratio of division work capacities may have a wide range, but equilibrium in work activity must be maintained within a narrow range.

Work capacity ratios are determined solely by heat volume requirements of the divisions, but maintenance of equilibrium in work activity involves two joint considerations: Equitable division of heat between the divisions of work and uniformity of gas and stock flow through the furnace.

Theoretically, the equilibrium must be maintained to perfection. In practice, "near perfection" is the goal.

Before hot blast stoves and

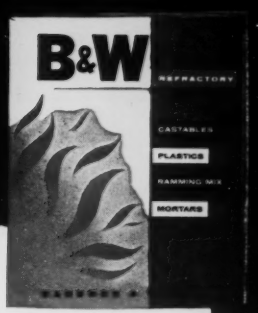
TABLE I—BENEFITS OF PREHEATING COMBUSTION AIR

Air weight, lb	Air temp, °F	Btu lb/air	Btu/lb air from carbon combustion	Total Btu/lb air for furnace work	Increase in available heat, %
1	250	62.0	753.82	815.82	
1	1000	248.0	753.82	1001.82	32.89
1	1100	272.8	753.82	1026.62	36.05
1	1200	297.6	753.82	1051.42	39.47
1	1300	322.4	753.82	1076.22	42.78
1	1400	347.2	753.82	1101.02	46.05
1	1500	372.0	753.82	1125.82	49.34

What are your refractory castable problems ?

- High Temperatures?
- Abrasion and Erosion?
- Slag Attack?
- Overhead Applications?
- Insulating Properties Required?

B&W makes a wide range of specialized refractory castables. Whatever your problem, you will find helpful data in B&W Bulletin R-35. Send for your copy today.



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BABCOCK & WILCOX

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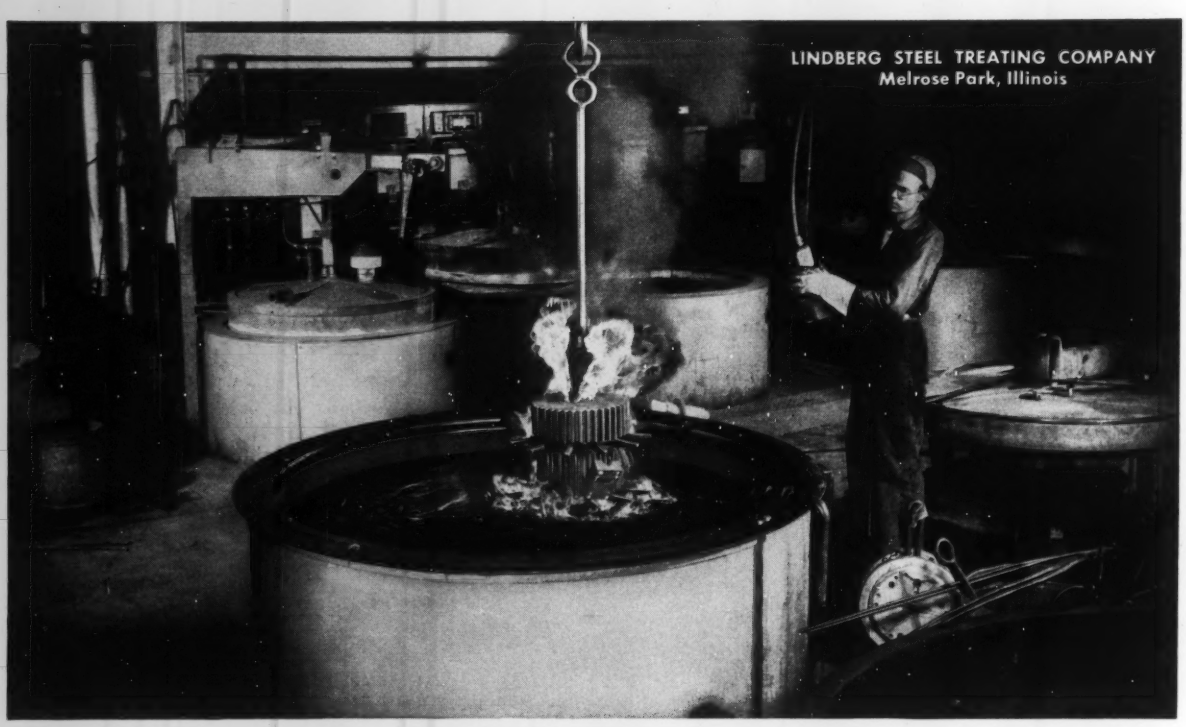
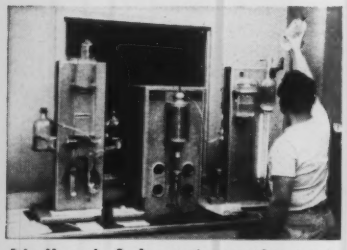


For machine shop tolerances— Lindberg uses Cities Service Quenching Oil



Lindberg's Lab stringently tests treated metals. Dimensional changes from poor quenching oil would quickly show up here. But Cities Service Quenching Oil cools metal with no significant dimensional change.

Some of Lindberg's Furnaces. Here, they heat-treat all kinds of steel products . . . bolts, washers, gear blanks, saw blade segments, etc. Steel for bars of Illinois State Penitentiary was one of their first jobs.

At Lindberg Steel Treating Company a routine order might include a dozen shafts, stamping and forming dies, jigs and fixtures and even production parts. But though the products might differ, most would carry the same stipulation—heat treat with very low dimensional change.

To some heat treating operations this might present a problem, but not to Lindberg. By the use of Cities Service Quenching Oil, they're able to cool their steel with no significant changes in dimension.

"In addition," say Lindberg metallurgists, "we like Cities Service Quenching Oil because it has high flash point, consistent viscosity, excellent oxidation resistance. and a stable cooling rate."

Anyone looking for a better quenching oil would do well to try this superior Cities Service oil. For further information, talk with your local Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

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PROGRESS . . .

steam-powered blowing equipment were used, the capacity of the smelting division was below that of the preparation division. Maximum heat could not be attained in the smelting zone. Equilibrium in processing activity wasn't a consideration because of the slow rate of processing.

Heat — Getting maximum heat from the combustion of fuel carbon with natural air at blast furnace tuyeres may be likened to the action of the blowtorch. Intensity is gained by adjusting the proportions of fuel and air. Beyond the optimum, intensity will be lost.

For example, any furnace will go cold in the hearth if it is overblown.

Before the development of the cross compound steam blowing engine (Thomas engine, 1852), the attainment of maximum heat at blast furnace tuyeres was impossible. Air could not be delivered to the furnace at the optimum volume and velocity. This contributed to the deficient relationship of the holding capacity of the smelting division to the preparation for smelting division.

Although the development of better ways to deliver air improved heat generation at the tuyeres, they did not change conditions within the furnace under which heat was generated, or increase the amount of heat available for furnace work beyond that generated from carbon combustion at the tuyeres. As long as a cold blast was used, the amount of heat available for furnace work was limited to that resulting from carbon combustion alone.

Hot Blast—Use of preheated air proved to be eminently successful —to a degree seemingly out of proportion to the amount of heat supplied by the preheat. The mechanism is explained by thermochemical principles of combustion and combustion conditions at blast furnace tuyeres.[1]

Carbon at blast furnace tuyeres is first burned to carbon dioxide (CO_2) and generates 14,800 Btu per pound of carbon. Immediately, the CO_2 reverts to carbon monoxide (CO), leaving only 4370 Btu per pound of carbon available for furnace work, based upon atomic weights and the fact that the combination of 1 lb of oxygen (atomic weight, 16) with carbon (atomic weight, 12) to form carbon monoxide (CO) will consume 0.75 lb of carbon.

Natural dry air contains 23 per cent oxygen by weight. So the weight of oxygen contained in 1 lb of air and burning its proportionate amount of carbon would be:

0.23 lb O + 0.1725 lb C = 0.4025 lb CO
0.1725 lb C × 4370 Btu/lb C
= 753.82 Btu/dry air

A temperature of 250°F is representative of blast furnace air as it leaves modern steam-powered blowing equipment before entering the stoves.

Benefits—Table I, which is based upon the above combustion data, illustrates the benefits of preheating. As indicated, each 100°F increase in blast temperature improves the heat value of 1 lb of dry air. Each 100°F increase in temperature for each 176 lb of air delivers as much heat to the tuyere zone as the combustion of 1 lb of carbon to CO (4370 Btu per pound of carbon).

Since it takes the same amount of heat to sustain carbon whether a cold or hot blast is used, all heat carried into the furnace with the hot blast is a net gain. The gain, in terms of quantity and percentage of increase, clearly illustrates the value of the hot blast.

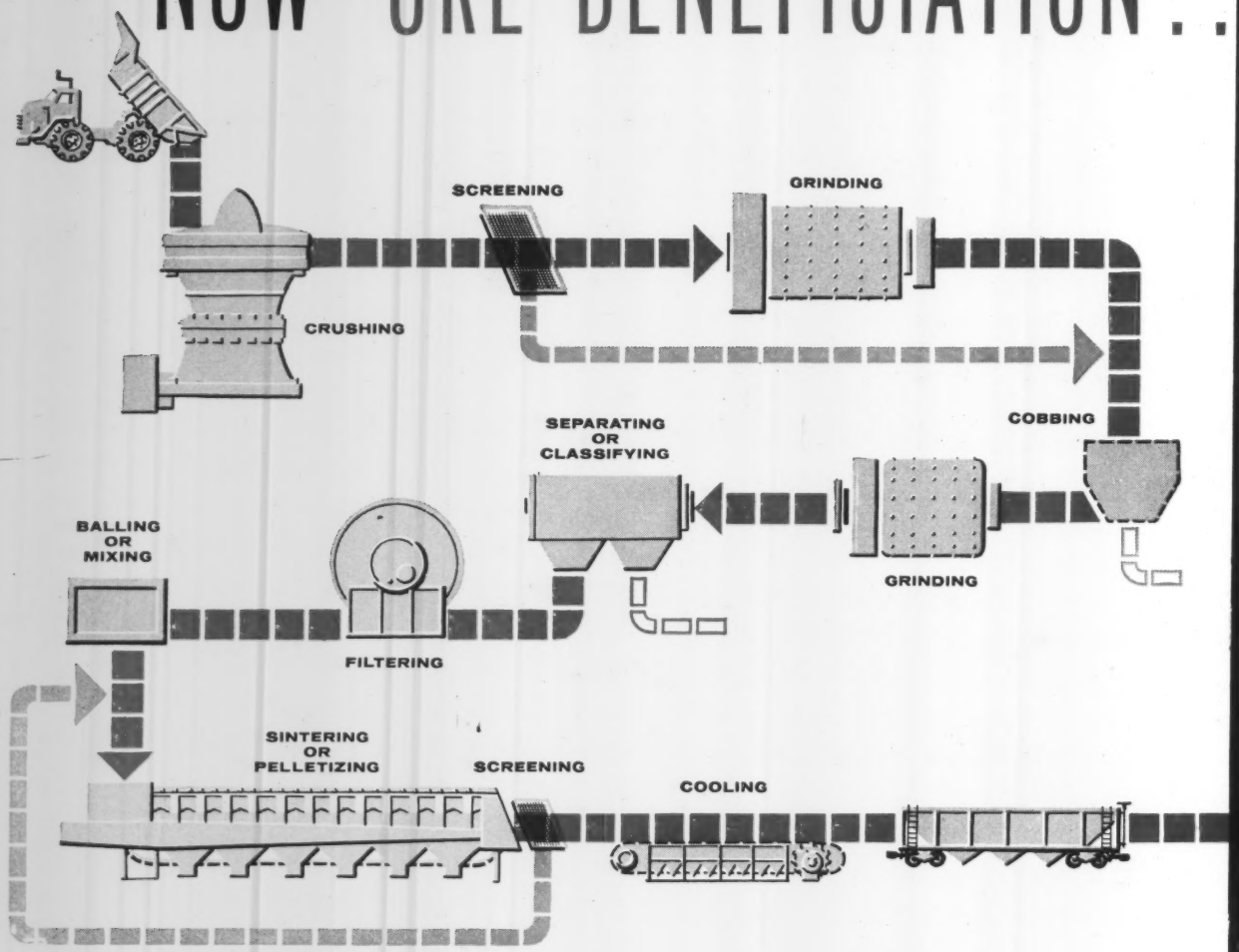
Marked improvements in iron production and fuel economy stimulated work on preheating equipment which resulted in the development of the regenerative brick stove. With it, air could be heated to a temperature higher than the

(*Please turn to page* 126)

Table II—Comparison of Heat Volume Consumption for Reactions Above and Below Fusion Temperature of Stock Solids

Per gross ton of iron (2240 lb)	South		North		East	
Below fusion temperature:	**Btu**	**%**	**Btu**	**%**	**Btu**	**%**
Carried off by gas (dry)	1,083,650	10.86	752,400	9.91	553,351	10.52
Carried off by gas moisture	651,819	6.53	700,100	9.23	122,241	2.32
Calcination of carbonates	1,176,470	11.79	702,000	9.25	247,050	4.69
Radiation, cooling water, & unaccounted for	2,478,910	24.85	2,128,569	28.05	619,159	11.76
	5,390,849	54.03	4,283,069	56.44	1,541,801	29.29
Above fusion temperature:						
Reduction of silicon	412,878	4.14	277,331	3.66	211,575	4.02
Reduction of manganese	30,610	0.31	31,367	0.41	65,498	1.24
Reduction of phospnorus	86,684	0.87	10,201	0.13	44,399	0.84
Solution loss	1,273,972	12.77	735,921	9.70	1,320,437	25.08
Dissociation of blast moisture	194,794	1.95	197,892	2.61	136,517	2.59
Carried off by iron	1,086,400	10.89	1,142,500	15.06	1,146,880	21.79
Carried off by slag	1,500,632	15.04	909,000	11.99	797,424	15.15
	4,585,970	45.97	3,304,212	43.56	3,722,730	70.71
Total heat consumed:						
Below fusion temperature	5,390,849	54.03	4,283,069	56.44	1,541,801	29.29
Above fusion temperature	4,585,970	45.97	3,304,212	43.56	3,722,730	70.71
	9,976,819	100.00	7,587,281	100.00	5,264,531	100.00
Ratio:	Fusion below/above		Fusion below/above		Fusion below/above	
Heat consumption	1.17:1.00		1.29:1.00		0.41:1.00	
Processing capacity	0.85:1.00		0.77:1.00		2.41:1.00	
	−0.15:		−0.23:		+1.41:	
Burden ratios:						
Ore/coke	1.60:1.00		2.41:1.00		2.55:1.00	
Ore, scrap/coke	1.73:1.00		2.44:1.00		2.78:1.00	
Ore, scrap, stone/coke	2.20:1.00		2.91:1.00		3.00:1.00	

NOW—ORE BENEFICIATION . .



In every phase of ore beneficiation symbolized in this drawing . . . in crushing, conveying, grinding, separating, sintering . . . Koppers experience can help you.

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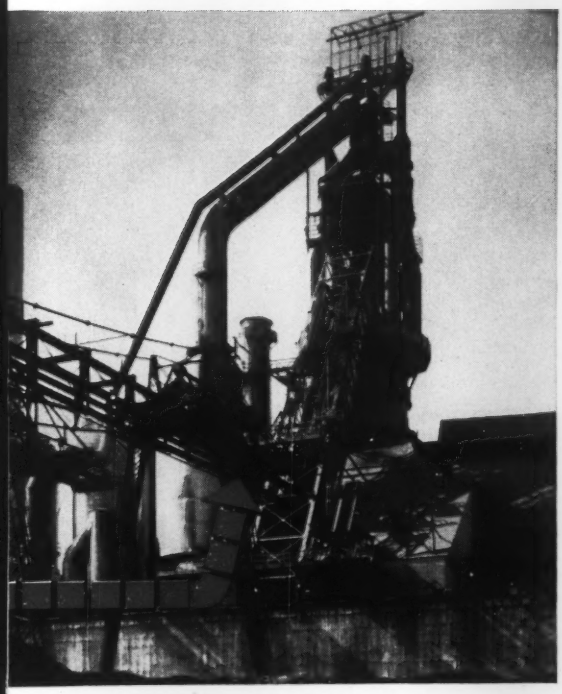
COMPLETE engineering and construction of all types of ore beneficiation plants is now available from the Freyn Department of Koppers. An Ore Beneficiation Section, staffed by experienced engineers, now offers a wide range of services to ore producers. This Section is backed by Koppers wide experience in steel plant construction, materials handling, and chemical engineering.



KOPPERS KNOWS THE STEEL BUSINESS

For 50 years Koppers has been designing, engineering and constructing almost every type of facility used in making steel—from coke ovens to completely integrated steel plants. Sintering—often a vital part of the ore beneficiation process—has been a specialty of Koppers American Ore Reclamation Section since 1911. And the Freyn Department of Koppers has done work in all phases of steelmaking. This experience can help you in the planning and building of an ore beneficiation plant.

KOPPERS KNOWS MATERIALS HANDLING

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KOPPERS KNOWS CHEMICAL ENGINEERING

Chemical engineering is assuming growing importance in the beneficiation of low-grade iron ores, and especially in non-ferrous ores. Koppers has many years of chemical engineering experience.

PUT THIS EXPERIENCE TO WORK

Let Koppers engineer and build your ore beneficiation plant. You will gain from Koppers accumulated knowledge of the equipment and operations involved in ore beneficiation. You will gain from Koppers knowledge of the steel business and its problems. You will gain from Koppers ability to handle *all phases* of the job competently—from initial planning and design to the construction and final operation of the plant.

Write for further information. A Koppers specialist in ore beneficiation will call on you. Koppers Company, Inc., Engineering and Construction Division, Freyn Department, Pittsburgh 19, Pennsylvania.

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ENGINEERING AND CONSTRUCTION

great majority of furnace operations could accept. This limitation is of major importance because it is positive evidence of the attainment of thermal equality between the processing capacities of the two divisions.

Recognition — The development of blast heating equipment, steam-powered blowing equipment and the construction of larger furnaces were contemporary with the development of lake ore usage. This combination of events brought the principles involving processing division capacity ratios and equilibrium to the fore.

J. E. Johnson Jr. was one of the first to publicize an analysis of operating conditions.[2] He pointed out the distinctive difference in thermal work performed during the preparation of raw stock for smelting and during smelting.[3]

Since all reactions involved in the preparation of raw stock are at temperatures which are below the fusion temperature of stock solids and those involved in smelting are above it, Mr. Johnson recognized that the two distinct divisions of work are carried on simultaneously. He concluded that equilibrium must be maintained.

To the casual reader, Mr. Johnson's theory may appear to be simple. But it is far from that when you consider the far-reaching effects of differences in chemical, thermal and mechanical activities which take place. They are determined by differences in the properties of the materials.

Logical—In the light of conditions under which furnace reactions occur (as disclosed by U.S. Bureau of Mines research[4]), Mr. Johnson's theory shows remarkable insight. It is in no sense derogatory to say his conception was not entirely correct. At the time, there were no comprehensive measurements of these conditions to check accuracy of his deductions.

In describing the activity of the processing divisions, Mr. Johnson used phraseology in the description of division dimensions which appeared to be logical. Stock, he stated, is prepared for smelting *in the shaft* of the furnace and is smelted *in the bosh and hearth.* Measurements made by the Bureau of Mines indicate that phraseology at times is only partially correct. Initial research by the bureau[4] appeared to support Mr. Johnson without qualification. Later work[4] with raw materials having different properties clearly disclosed that he was not entirely correct.

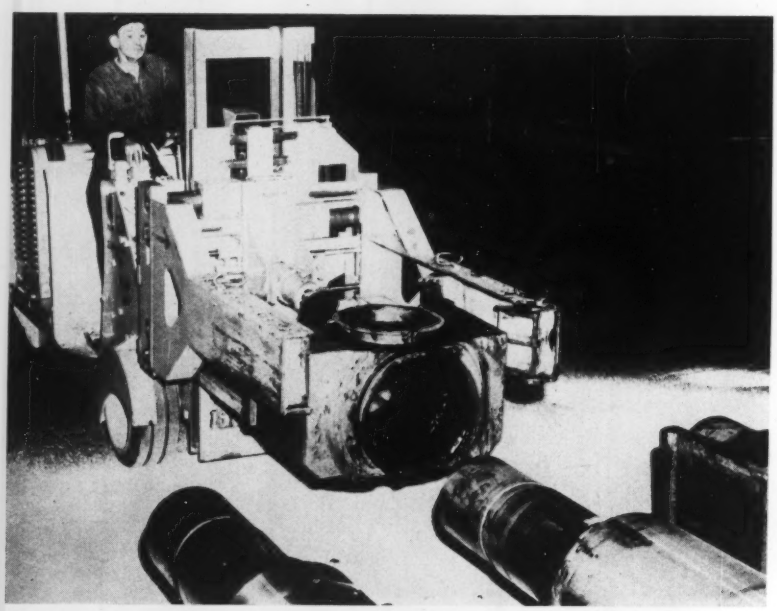
Elevations of two furnaces the bureau studied are shown on page 120. The dimensions of the smelting divisions are shaded. Gradations of shading indicate the approximate relationship of slag temperatures in its progressive stages of compositions. The coke combustion zone also is shown. The measurements recorded are from commercially successful operations. They clearly illustrate that equilibrium in work activity can be maintained despite a wide difference in dimensions.

Comparison—The difference in dimensions is readily explained when the chemical compositions of the two mixes are compared. The burden materials of operation No. 391 were lean southern ores (average Fe content was 43.28 per cent) and high ash coke. Some of the ore was self-fluxing. Materials in operation No. 442 were moderately rich lake ores (average Fe content was 51.03 per cent) and low ash coke (8.69 per cent). Carbonate content of the No. 391 burden (CO_2 contained in self-fluxing ore and in fluxing stone) was virtually twice that of the No. 442 burden (Carbonates evolved through calcination.) No. 422 burden was greater than that of the No. 391 burden.

Indicated differences in the chemical composition of burden materials are the items of major importance because of their effect on thermal requirements.

Furnace No. 391 used 2091.35 more pounds of air blast per gross ton of iron than Furnace No. 442. A greater weight of gas and a greater volume of heat were generated per gross ton of iron in operation No. 391 than in operation No. 442. But the development of heat of sufficient intensity to cause the initial fusion of stock solids did not occur in operation No. 391 until the stock had descended 44 ft below the zero stockline. In operation No. 442, a like fusing temperature developed only 13 ft be-

(*Please turn to page* 129)



Chock-Pulling Lift Truck Saves Roll Shop Time

Pulling roll chocks in the roll shop of the cold reduction sheet mill at U.S. Steel's Gary, Ind., Works used to be done by hand, with an assist from overhead cranes. Now a lift truck with a special attachment grasps the heavy chocks and removes them. If they stick, a hydraulic ram built into the attachment jars them loose. The truck handles an average of 12 pairs of chocks during an 8-hour shift, freeing cranes for other work. Maker of the truck is Automatic Transportation Co., Chicago

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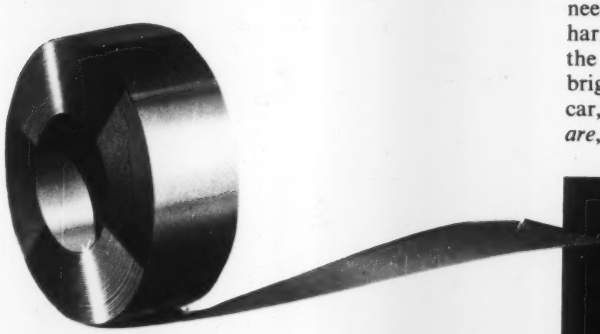
Let it rain, mist or dew . . . for the lifetime of the car, stainless steel brightwork never needs care. Exposure to the elements can't harm it. You don't lift a finger or pay a penny to keep the showroom shine of *stainless*. ● Strong, hard, ever-bright stainless steel will serve you best on your new car, and protect top value when you sell. *And the chances are, it'll be* SUPERIOR.



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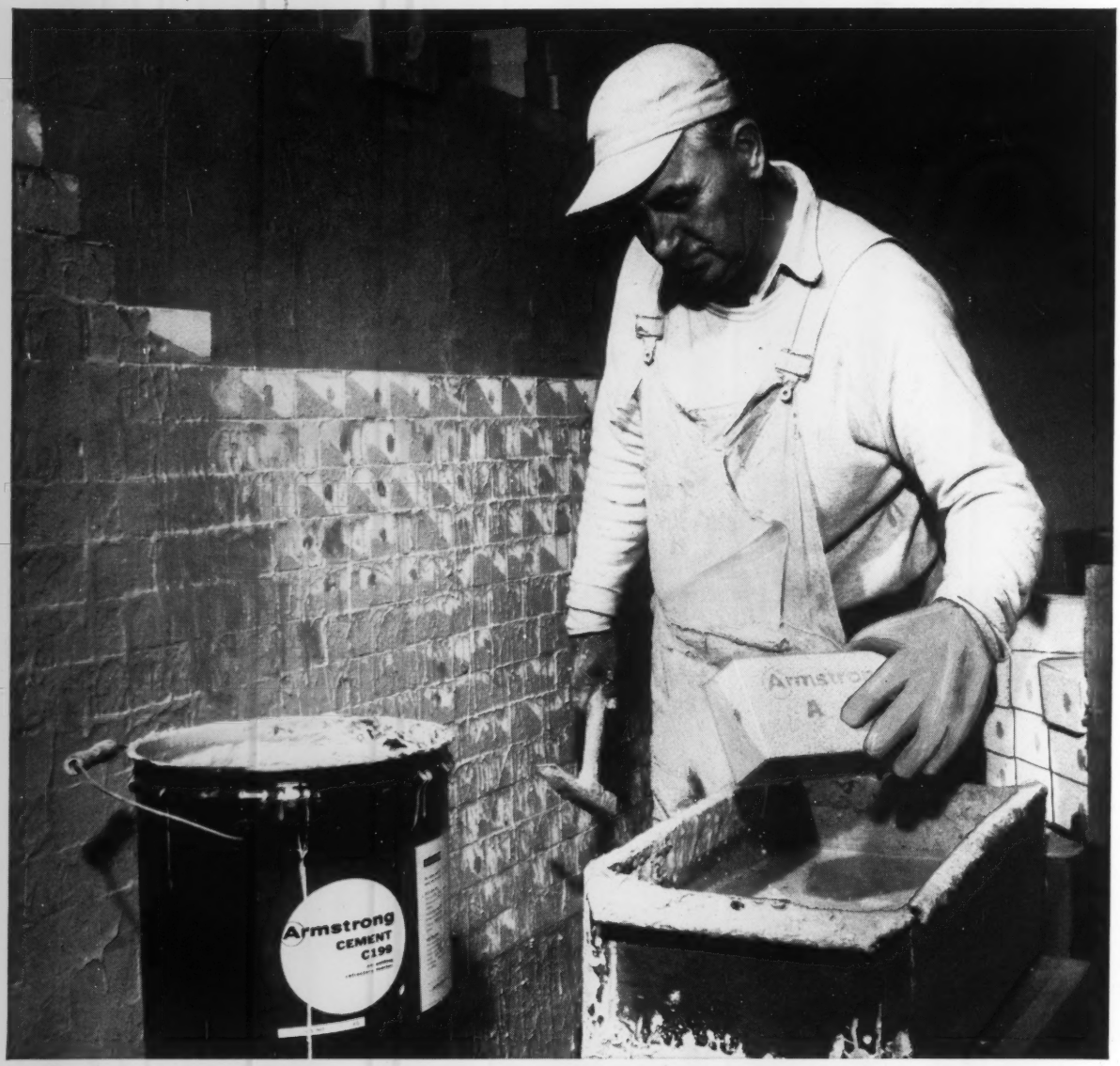

Accurately sized Armstrong Insulating Fire Brick and all-purpose C199 Cement speed construction of this furnace wall.

How to speed dip joint construction

The accurate sizing of Armstrong Insulating Fire Brick permits fast, uniform furnace wall construction with dipped or thinly trowelled joints. All five types of Armstrong Brick are made slightly oversize and then machined down to specific dimensions, with sharp, accurate corners and edges.

For best results, use Armstrong C199 Cement. This air-setting, refractory mortar forms a joint that is actually stronger than the brick it bonds. It takes a firm set at room temperature and maintains this strength to 2910° F. Armstrong C199 Cement can be used with all types of fire clay brick and insulating fire brick. By standardizing on this one mortar, inventories are simplified.

A new folder gives you details on the complete line of Armstrong Insulating Fire Brick and Refractory Cements. Write Armstrong Cork Company, 2707 Reed Ave., Lancaster, Pa.

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low the zero stockline, even though Furnace No. 442 was 8 ft higher than Furnace No. 391.

Differences in the composition of the two burdens and the nature of the thermochemical reactions caused the apparent discrepancy.

Capacities — Approximate processing capacities and their ratios to each other can be indicated with reasonable accuracy with heat balance calculation. Effects which raw materials properties and blowing rates have on thermal requirements and effects (and the ratio of processing capacities) are clearly illustrated this way: List items of heat consumption under headings indicating Btu consumption at temperatures below and above fusion temperature of stock solids, or preparation and smelting.

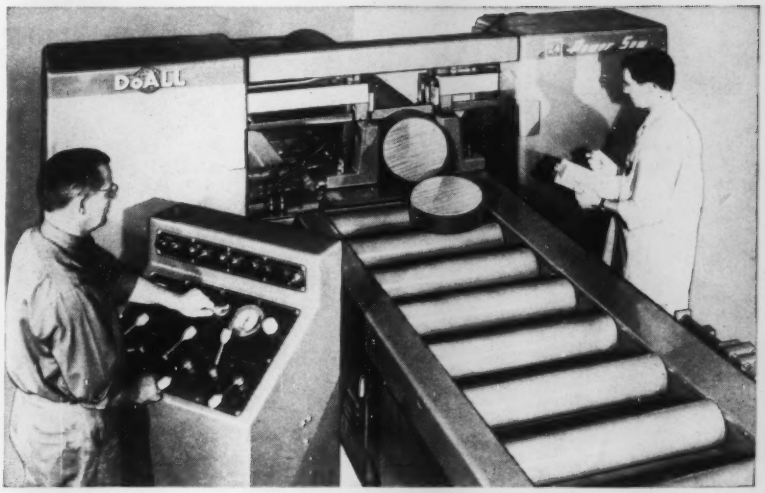
Table II lists heat balance data for three furnace operations where properties of raw materials cover a wide range. The operation marked South is the No. 391 furnace illustrated on page 120.

Operating data recorded in Technical Paper No. 442[4] are insufficient to calculate a heat balance, but data listed under North in Table 2 is representative of lake ore (Mesabi) operations using a moderate blowing rate. The blowing rate is the chief difference between operation No. 442 (page 126) and the North operation (Table 2). The weight of air used in operation No. 442 is 12.9 per cent greater than that of the North.

The East operation is an eastern district practice. The burden was sintered ore concentrates and other volatile-free materials.

Comparison of such data with actual furnace operations clearly illustrates the ratio of heat consumption of the division of processing (as determined by the chemical composition of the burden materials) and the effect of the ratio upon the maintenance of equilibrium between the work activity of the divisions.

To illustrate, the major part of the heat consumed at South for the evolution of volatile matter was for the calcination of carbonate. The minor part was consumed by the reaction which converts moisture to water vapor. At North, where burden materials contained less carbonate and more



New automatic bandsaw **cuts off metal up to 24" x 24" cross-section faster at lower cost than ever before possible.**

Pushing Buttons for Better Living

The man in the picture above is earning himself a high standard of living with a modern push-button "tool." He is sawing off solid steel blanks for gears that will go into a metal forming press. The press will turn out parts for pop-up toasters—which the saw operator's wife can readily afford to buy.

Here, in action, we see the fundamental of the American economic system. The better our tools, the better, more abundant and lower priced the products they turn out.

During the past 10 years, new tools have increased individual productivity nearly 20%. But it isn't enough. Not with our population growing faster than the working force. Not with wages and costs rising faster than productivity.

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Pop-up toasters are dependable and moderately priced, thanks to the investment by industry in constantly improved tools.

continuous-cutting saw band made of high speed steel which can be driven through the toughest metals at new faster rates. And, less of the valuable metal turns into "saw dust," because the cut is one half as wide as that left by other saws.

This revolutionary new tool substantially reduces the cost of goods. Since the first step in manufacturing metal products is often a "cut-off" operation, manufacturers are invited to investigate its great savings possibilities.

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Manufacturers seeking ways to combat rising costs will also find much of interest in the 1500 DoALL machine tool, cutting tool, gaging and supply items. Call DoALL locally or write.

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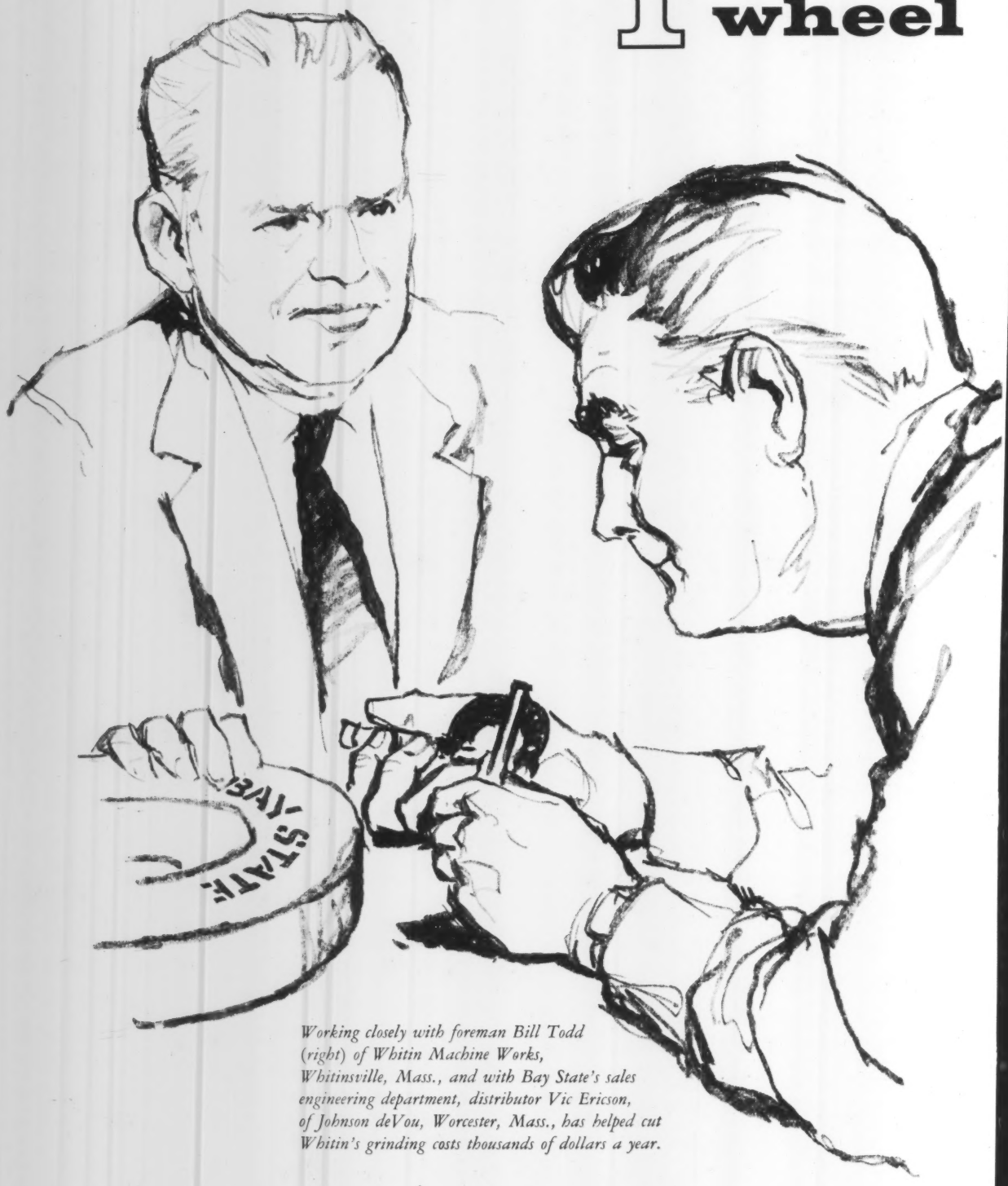
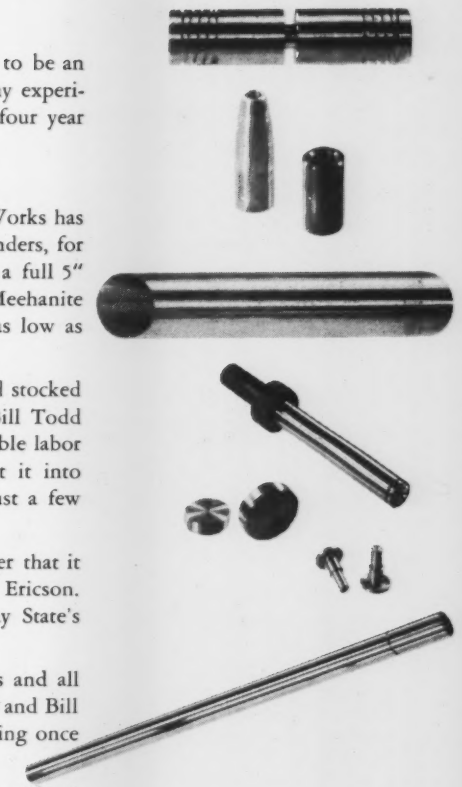


Working closely with foreman Bill Todd (right) of Whitin Machine Works, Whitinsville, Mass., and with Bay State's sales engineering department, distributor Vic Ericson, of Johnson deVou, Worcester, Mass., has helped cut Whitin's grinding costs thousands of dollars a year.

do the work of 12



This is the story of two stubborn men and what seemed to be an impractical idea. The idea still seems pretty amazing to many experienced grinding men . . . but time and cost sheets over a four year period *prove* that it works.

Here's the story.

The central grinding department at Whitin Machine Works has all the problems of job-shop operation. Their centerless grinders, for example, are used to finish parts that range from 1/8" to a full 5" diameter and come in bronze, brass, aluminum, cast iron, Meehanite and all types of soft and hardened steel. Runs are short; as low as three or four pieces and rarely over a couple of hundred.

To handle this tremendous variety of jobs, the shop had stocked a dozen different types of grinding wheels and foreman Bill Todd wanted to simplify. He wanted to cut the amount of valuable labor and machine time that went into wheel changes and put it into production. And, what he really hoped to get was not just a few multi-purpose wheels but *one all-purpose* wheel.

Successful in convincing Whitin's tool control engineer that it was worth the try, he called in Bay State distributor Vic Ericson. Ericson accepted the challenge and went to work with Bay State's sales engineering department. The effort paid off.

The result was a single wheel that handles all the sizes and all the metals. On regular work, finishes average around #16RMS and Bill Todd's skilled operators can get as fine as #2; a single dressing once an hour maintains normal high production rates.

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NOW | 3 mobile ways to efficient, low cost material handling

New 30-B TRANSIT CRANE

35-ton rated lifting capacity
40- to 130-ft. boom lengths

Here's a new Bucyrus-Erie Transit Crane with the extra power, reach, and capacity you need for heavy-duty material handling from spur track or yard assignments to plant construction and maintenance. Pictured here is a pilot model, handling heavy concrete slabs at the manufacturer's test farm.

22-B TRANSIT CRANE

25-ton rated lifting capacity
30- to 80-ft. boom lengths

Durability, strength, and simple easy-to-maintain machinery are a few cost-cutting reasons for the popularity of this Transit Crane. At Steep Rock Lake in Ontario, Steep Rock Iron Mines, Ltd. uses its 22-B to move this dredge anchor in a storage yard, one of several scattered handlng jobs.

15-B TRANSIT CRANE

15-ton rated lifting capacity
30- to 70-ft. boom lengths

Quick moves and easy maneuvering in congested plant areas are time-saving factors in this efficient operation. This 15-B Transit Crane, equipped with a 70-ft. boom plus 30-ft. jib, handles feed screening equipment at the Ralston Purina Co., Stockton, Calif. Rubber tires "float" over spur tracks. 375E57

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PROGRESS . . .

moisture than South, the heat consumption for the two reactions was virtually equal. At East, where the burden materials contained less carbonate and less moisture than either South or North materials, heat consumption was proportionately less.

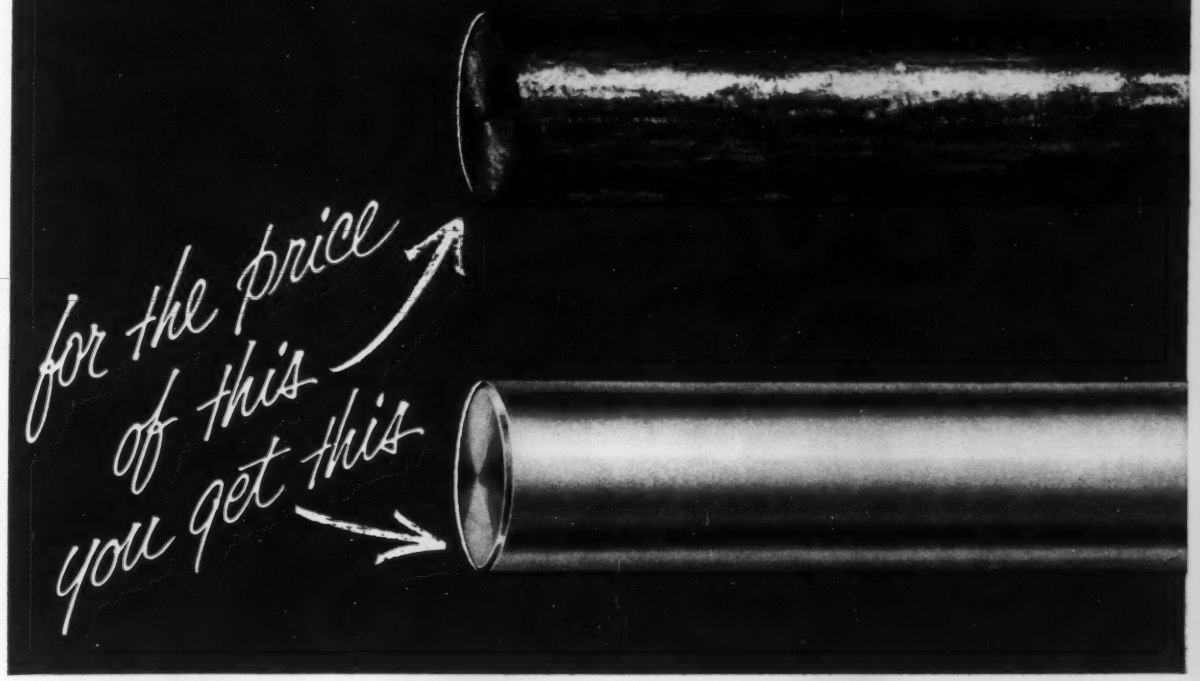
The calcination of carbonate consumes heat in the sense that it is rendered latent. So there is positive prevention of heat volume concentration, which alone can create temperature. The reaction converting moisture to water vapor consumes heat in the sense that it is absorbed by the water vapor produced with the reaction while still retaining its sensible nature. This reaction is a deterrent to heat volume concentration but not a positive preventive. The amount of heat consumed per pound of carbonate (CO_2) evolved from stock is substantially greater than that consumed per pound of moisture (H_2O) when converted to vapor.

Effect—What would happen if the South blowing rate were used at the North or East operation (Table 2) is clearly illustrated in the No. 442 Furnace cross section. As an example: Use the No. 391 Furnace blowing rate (27.7 per cent greater weight of air per gross ton of iron) in Furnace No. 442. In the absence of sufficient thermochemical reactions to consume the excess heat which would have been delivered to the preparation for smelting division, equilibrium in mechanical and thermal activity would have been destroyed. The furnace could not have been operated. Like conditions would have developed to a greater degree at East if the blowing rate of South or North were used.

The percentages of Btu consumption in the divisions of processing illustrate how burden materials of South and North caused preparation for smelting capacity to be deficient in relation to smelting capacity—while materials used at East caused smelting capacity to be deficient in relation to preparation for smelting capacity.

With the ratio of heat consumption and processing capacities indicated for the burden materials, maintenance of equilibrium in thermal activity is effected by blowing rates and blast temperatures which

Now, all former hot rolled Crucible REX high speed rounds supplied with a new thrift finish



Here's a revolutionary, new Crucible policy designed to provide an improved product—save time and processing costs. Now, Crucible furnishes all REX® high speed rounds from ⅝" up with a machined surface, close to size and free from decarburization. All bars from ¼" to ⅝" round are supplied cold finished.

This new *thrift* finish means important savings to you — whether you've been paying extra for decarburization and stock removal, or grinding or rough turning rounds in your own shop. Of course, where extremely close tolerances are demanded, precise centerless grinding is still available at a small extra.

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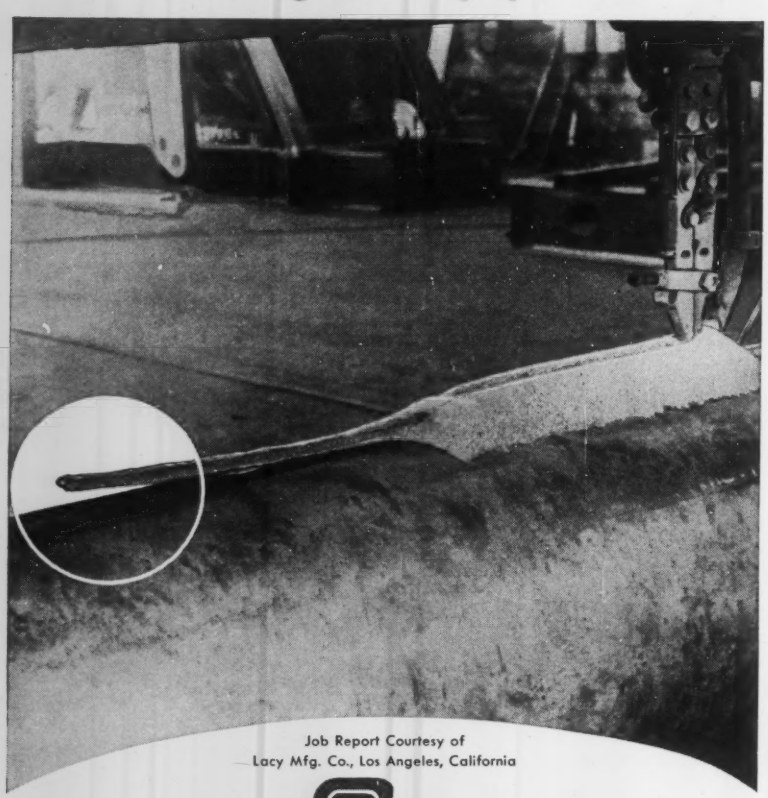

Job Report Courtesy of
Lacy Mfg. Co., Los Angeles, California

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Arcos research and experience with stainless weld metal now pays you *another dividend*—for the first time... consistently *self removing slag!* On the job above, submerged arc welding of a section of pipe for petroleum equipment, two passes were made with 1/8" coiled CHROMENAR KMo Stainless Wire and ARCOSITE S-4 Flux. As the photo shows, the cooling slag is lifting free by itself ... leaving a clean, smooth bead. Think what this can mean to you on your own submerged arc welding jobs ... saving time and money ... better welds than ever before. ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

PROGRESS . . .

will assure equitable division of heat volume.

	South	North	East
Lb dry air, gross ton iron	9627.88	6673	4548
Blast temp, °F	957.00	1248	1550

Since there is constant flow of gaseous materials and an intermittent flow of solid and molten materials into and out of the furnace, equilibrium in the rate of flow must be maintained within a small range of "near perfection," or the furnace cannot be operated:

1. Because processing activity involves both thermochemical and mechanical activity, equilibrium must be maintained in both.

2. Because of the two distinct divisions of processing, equilibrium in activity must be maintained in each division separately and between divisions at the same time.

3. Because the numerous reactions attendant to iron ore production are all certain to occur, the general effect of equilibrium can be illustrated with reasonable accuracy by mathematical equations. Analysis of the effect of each reaction is not necessary.

Mechanical equilibrium:
Let CZ=total cubical displacement of space within furnace.

Preparation for smelting:
Let A=Space occupied by raw stock solids (ore, stone, scrap, fuel).
Let B=Space occupied by gas (gas rising from smelting division of processing, plus volatile matter evolved from stock).
Let C=Total space utilized in preparation for smelting.
Equation, $A + B = C$.

Smelting:
Let X=Space occupied by all material in smelting division of processing (solid, semisolid, molten and gaseous).
Let Y=Sensible heat in smelting division of processing (heat is energy but does not occupy space).
Let Z=Total space utilized in smelting action (a variable determined by effect of Y quantity on X quantity).
Equation, $X + Y = Z$

Combined divisions of processing:
Equation, $C + Z = CZ$

A and B quantities in the preparation for smelting division and the X and Y quantities in the smelting division must be maintained in equilibrium with each other; C and Z quantities of the divisions must be maintained in equilibrium with each other.

[1]U.S. Bureau of Mines technical paper No. 391.

[2]"A Two Thermal Equation Theory," AIME meeting, Washington, 1905.

[3]"Principles, Products and Operation of a Blast Furnace," by J. E. Johnson Jr., 1918.

[4]U.S. Bureau of Mines technical papers Nos. 391, 397, 425 and 442.

• *Extra copies of this article and Part II, which appears next week, are available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

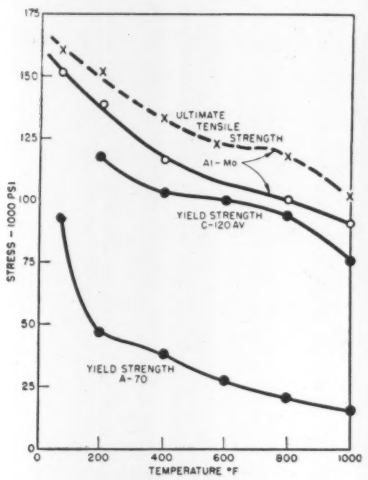
New Ti Alloy

Containing 6.5 per cent aluminum and 3.75 per cent moly, it stays tough at 1000°F

AN aluminum-moly titanium alloy (Rem-Cru C-130AMo) is strong at room and elevated temperatures, says the developer, Rem-Cru Titanium Inc., Midland, Pa. The firm attributes these advantages to the alloy:

1. Improved time-temperature-stress stability.
2. Deep hardenability and excellent heat treated properties.
3. Better high temperature strength.

The graph below compares the relatively short-time yield strength and creep of the new and previous titanium alloys.



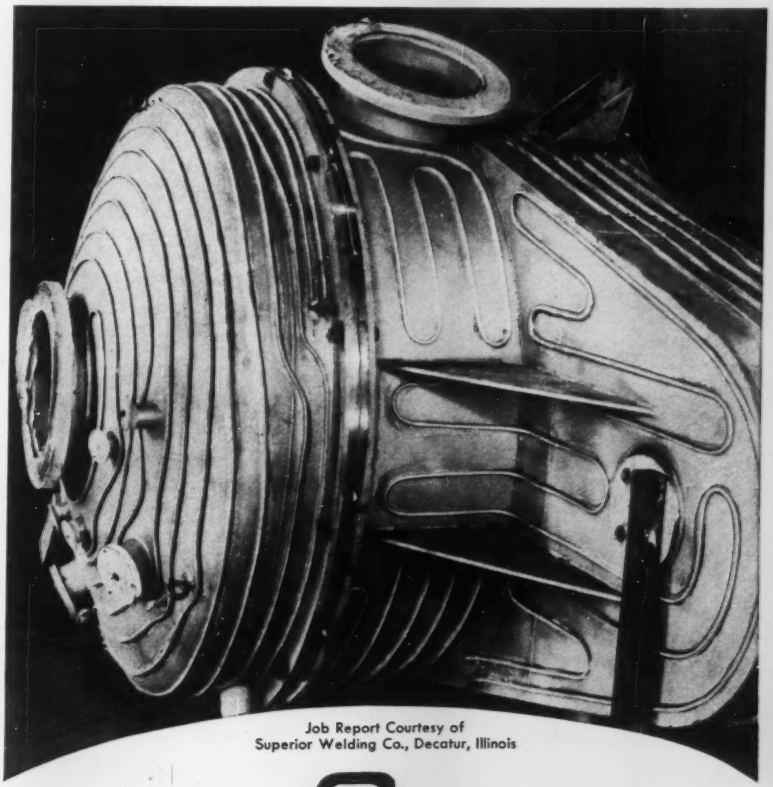
PRELIMINARY DATA
. . . for Rem-Cru C-130AMo alloy

Samples highly stressed at 600 to 1000°F show undiminished strength and good ductility at subsequent room temperature.

Laboratory tests have proved that 2-in. thick samples have a heat treated tensile strength of 160,000 psi without sacrificing ductility.

Dr. Walter L. Finlay, vice president and research manager, pointed out that the material has promising properties for jet engine discs and blades and high-strength, lightweight airframe forgings, fasteners and similar parts. He also pointed out that shop experience is being obtained to substantiate acceptance for design purposes.

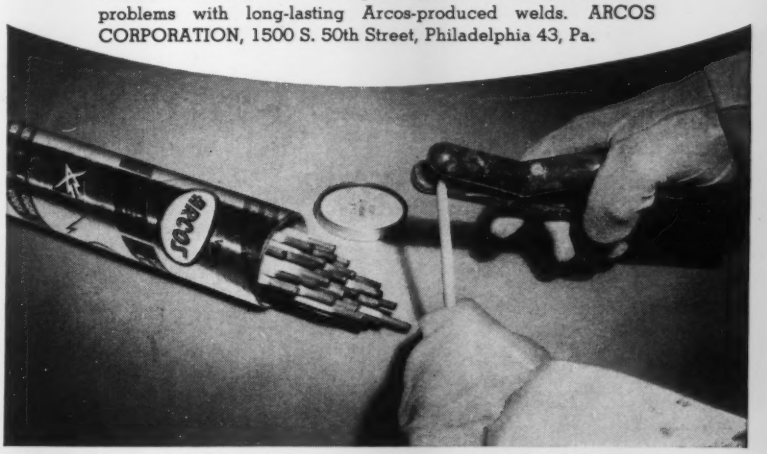
When stainless welds must be VACUUM TIGHT



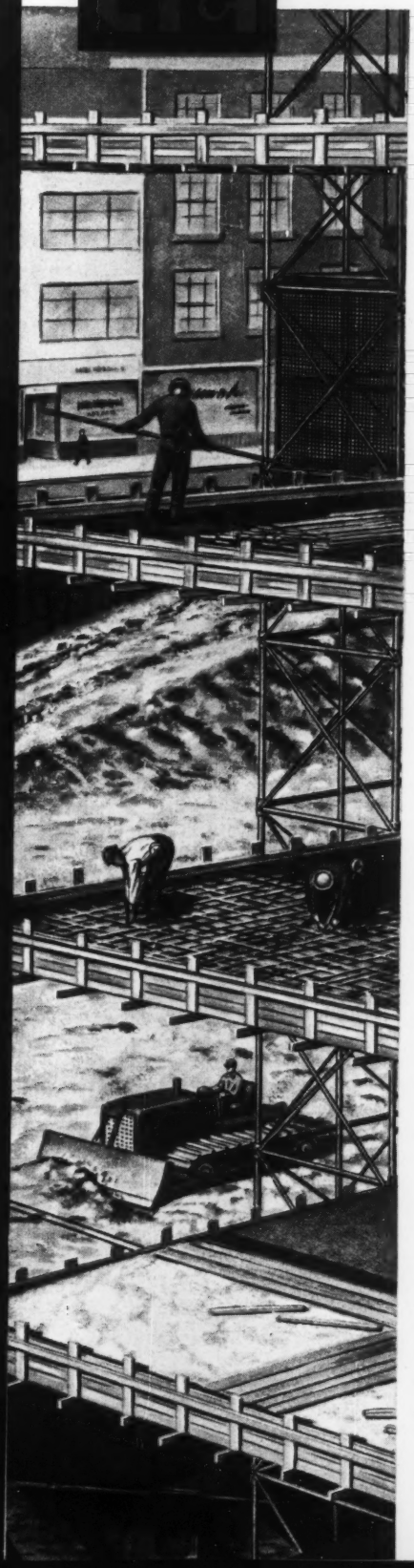
Job Report Courtesy of
Superior Welding Co., Decatur, Illinois

WELD WITH ARCOS STAINLESS ELECTRODES

Shown here is a stainless steel furnace body of type 304 ELC for use under very high vacuum conditions in the casting of metals where exceptional purity is required. Arcos Chromend K-LC Stainless Electrodes were used because Arcos electrodes not only assured the proper weld metal chemistry, but also the necessary soundness to insure vacuum tight welds. Save money and future problems with long-lasting Arcos-produced welds. ARCOS CORPORATION, 1500 S. 50th Street, Philadelphia 43, Pa.



From start to finish . . .

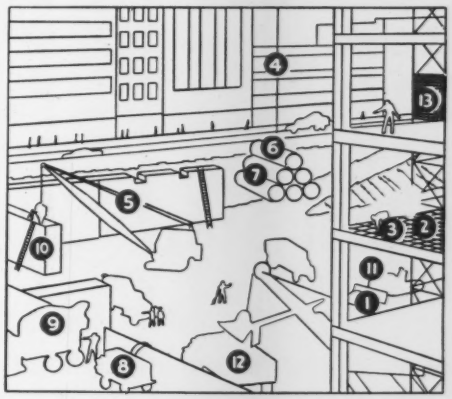


STEEL PRODUCTS

are helping America's builders

The total cost of an office building is tremendous. Needless to say, both builder and owner try to hold this cost to a minimum . . . and it's a mighty good reason why you'll see so many CF&I products around building sites. For builders know that top-quality CF&I Steel Products help them get the job done swiftly, as well as economically and safely.

You, too, can use CF&I Products to excellent advantage in your own operations. For full details, see your nearby CF&I representative.



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3. **Cal-tie Wire**
4. **Wickwire Wire Rope**
5. **Wickwire Boom Pendants**
6. **Wickwire Wire Rope Slings**
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8. **Claymont Heads and Fittings for Air Compressors**
9. **Wickwire Valve and Clutch Springs**
10. **CF&I Nails and Staples**
11. **Wissco Perforated Metals**
12. **Claymont Fabricated Steel Parts**
13. **CF&I Hardware Cloth**

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5226

Here's what happens to carbon steel repeatedly heated to 960°F for 12 hours in an annealing furnace. Pallet supported 3000-lb aluminum coils. A high strength alloy was the solution

Operator loads an annealing furnace at Cochrane Foil Co. Cycle lasts 12 hours. Coils remain on pallets from receiving to rolling mill

Alloy Steel Solves Warping Problem

When carbon steel wouldn't stand up, this firm turned to an alloy that lasts five times as long. Pallets are said to withstand 960°F. Heat treatment is the key

PALLETS made of high strength alloy steel solve warping caused by high temperature service, says Cochrane Foil Co., Louisville.

The firm had a coil handling problem which threatened to seriously reduce its foil yield. After two years, its more than 750 high strength steel pallets show no sign of warpage.

Cycling Cuts Life—Pallets are heated to 960°F for 12 hours, while holding two 3000-lb aluminum coils during annealing. Plant engineers estimate that the alloy units will last ten years—that's a fivefold improvement over the carbon steel type previously used.

Carbon steel pallets ordinarily are strong enough and tough enough for most handling problems. But they warped so badly at Cochrane that the edges of some of the aluminum coils were damaged. It cut into foil yield.

Heat deformed pallets also limit stacking height. More space was needed for storing. Pallets are now stacked four high.

Designed for Furnace—The alloy pallets are 36 in. x 72 in. and are corrugated and formed in a latticework pattern. It permits free circulation of air in the annealing furnace. Reinforcing stringers also are corrugated to provide better distribution of coil weight.

While design is important, Cochrane engineers point out the value of the steel. Called Republic 50, it has a minimum yield point of 50,000 psi, minimum tensile strength of 70,000 psi.

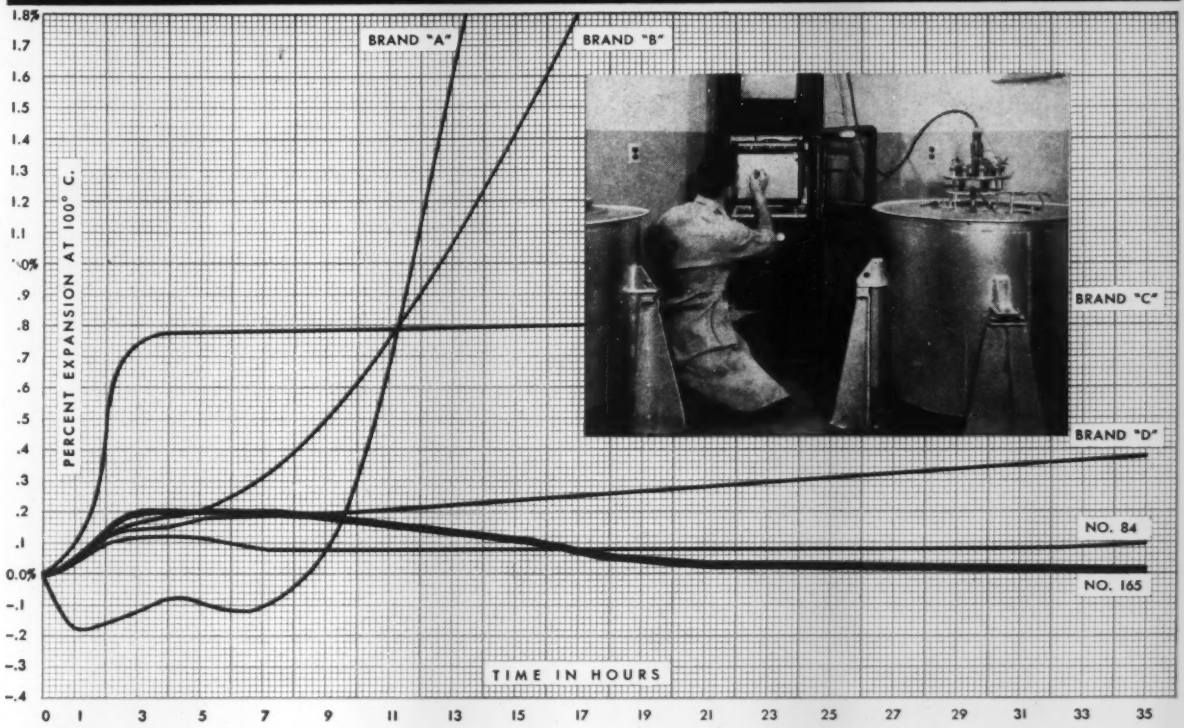
The combination of alloying materials and heat treatment gives the steel its strength to resist service at prolonged high temperature.

Operation—Each annealing furnace at Cochrane holds eight pallets (16 coils). Up to 48,000 lb of aluminum can be annealed in one loading. Pallets are stacked two high in the furnace.

Once coils are loaded on pallets they are carried through weighing, preannealing and postannealing storage until loaded into the rolling mill feed.

The pallets were designed and constructed by the Pressed Steel Division, Republic Steel Corp., Cleveland.

"SOAK AND SWELL" CHART shows why Permanente 165 Ramming Mix gives longest-life furnace bottoms



HYDRATION—reaction with water—during the heat-up period usually causes swelling of rammed magnesia bottoms. Leading ceramic engineers believe that as little as 0.3% expansion indicates damaging hydration, shorter bottom life.

To measure these minute expansions, Kaiser Chemicals Research developed the sensitive electronic instrument shown above. This device, called a dilatometer, can accurately measure and record expansions of less than 0.01% and maintain a constant temperature within $\pm 0.5°C$.

Dilatometer Traces Charts

For the test charted above, equal size blocks freshly prepared from each of six well-known ramming mixes were placed in a common heating chamber and attached to the recorder.

The chamber was then heated to just below the boiling point of water with the atmosphere held at 100% relative humidity to create forced hydration conditions. Finally, the samples were allowed to soak for 35 hours to simulate hydration conditions which a mix may encounter in the deeper regions of a bottom.

As you can see in the chart, Permanente 165 shows virtually no signs of expansion ... proof that it resists hydration significantly better than any other ramming mix tested. (Permanente 84 Hot Patching Mix runs a very close second.)

Research Aids Bottom Performance

Permanente 165's outstanding resistance to hydration is an excellent example of how Kaiser Chemicals Research is working to give you furnace bottoms that last longer, need fewer repairs. Why not let your Kaiser Chemicals Sales Engineer provide research, design and installation assistance to help you take advantage of this superior ramming mix?

Call or write Kaiser Chemicals Division, Dept. R7223, Kaiser Aluminum & Chemical Sales, Inc., at any of the addresses listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
HAMMOND, IND. . . . . 518 Calumet Building
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MEMO TO MANAGEMENT

INTERPLANT CORRESPONDENCE

From the desk of the

PRODUCTION MANAGER

You may not have noticed it from their outward appearance—but take it from me, the Detrex Paintbond process has really improved the finish on our refrigerators.

The enamel finish flows on smoother, easier and faster than ever before. Laboratory tests prove that resistance to rust and corrosion is increased far beyond "normal use" requirements.

Our sales department can't place too much emphasis on this Paintbond feature.

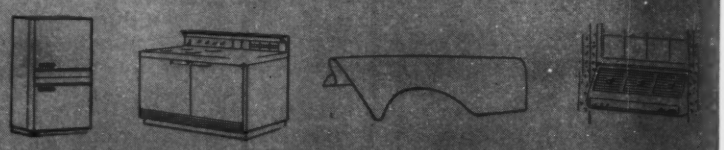
TEST PANEL # 1

TEST PANEL # 2

DETREX Paintbond

Scribed panels illustrated above demonstrate effectiveness of exclusive DETREX Paintbond process in accelerated corrosion tests. Panel with ordinary finish shows excessive "creepage" or flaking at scratch lines after only 48 hours of salt spraying. Other panel, thoroughly protected with DETREX Paintbond, remains unaffected after 250-hour salt spray test!

Complete line of DETREX phosphate coatings includes zinc-iron phosphates, iron phosphates and phosphates for cold extrusions.



Whatever your cleaning and processing needs!

A pioneer in the metal cleaning and processing field since 1920, Detrex is now the established leader—offering the finest and most complete combination of chemicals, equipment and service in the industry.

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Part of the program in the school for safety is to give the employees experience working in a gaseous atmosphere

CO Safety Stressed

Ford's program includes regular inspection, adequate detection and proper use of equipment

By R. D. BYROM

Safety Engineer, Steel Division
Ford Motor Co., Detroit

NUMEROUS precautions to prevent asphyxiation are taken at the Steel Division, Ford Motor Co., Detroit. They include a gas training school, safety equipment and regular inspections and maintenance in danger areas.

No. 1 Killer—Industrial plants, especially in metal producing, must guard against carbon monoxide. Colorless, odorless and tasteless, it is a deadly gas. As little as two parts in 10,000 will make personnel ill for several hours.

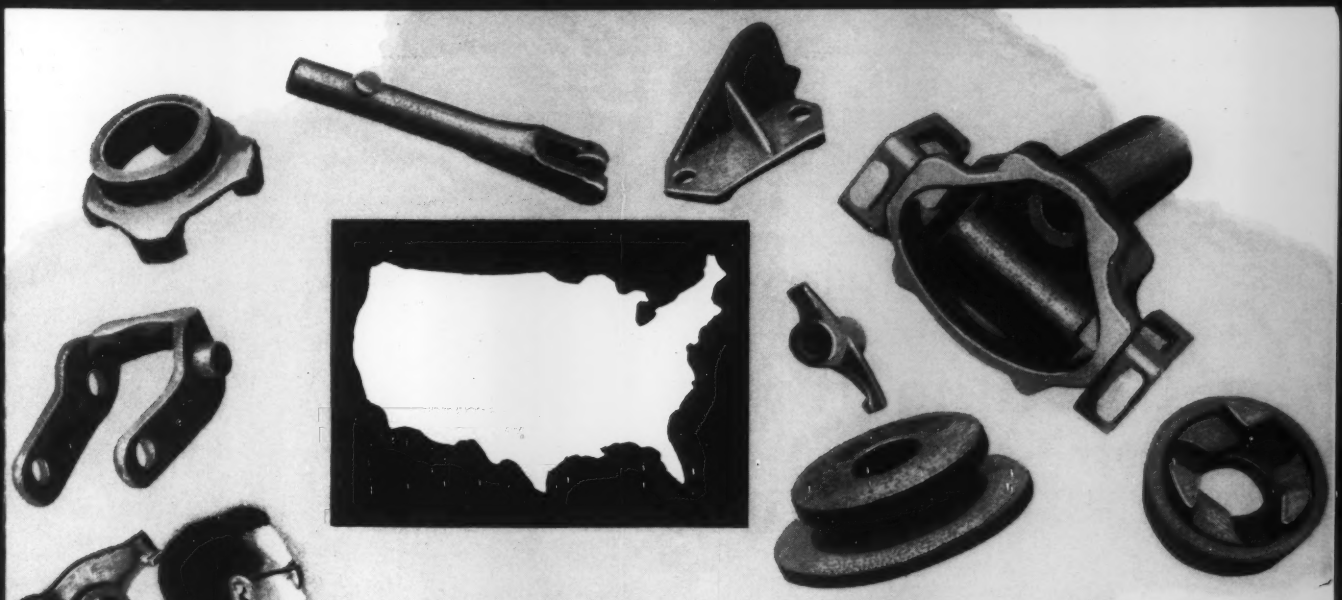
Modern instruments, such as those produced by Mine Safety Appliances Co., Pittsburgh, have been developed to detect this gas. These include the Colorimetric Tester, and the Carbon Monoxide Alarm.

Safety by Education — Ford's safety program is based on the principle that regular and repetitive drills under simulated field conditions afford the best protection.

All employees working in areas that could become contaminated by gas attend a training school. Maintenance men must take refresher courses twice a year.

Safety information and educational bulletins on such topics as gas detection and histories of asphyxiation in other plants are

(*Please turn to page* 144)



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Then National is your answer. We play no favorites, have no prejudices —for we cast all these metals.

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Westinghouse mill motors with **silicone insulation**

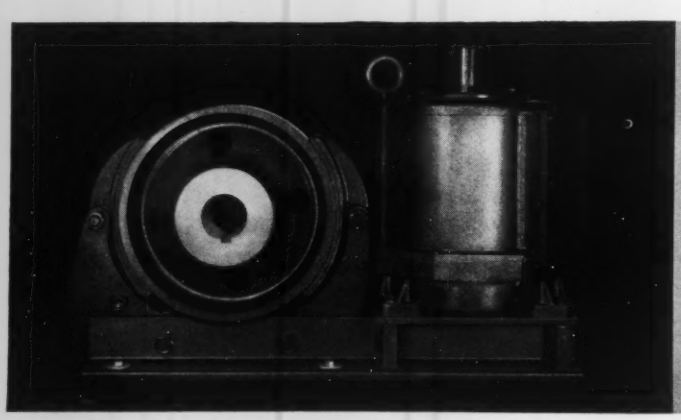
For longer motor life under the toughest operating conditions

Silicone insulation for longer motor life . . . improved field coil design for greater capacity and cooler operation . . . heavy-duty shaft, bearing and housing design to take high torque loads . . . make the Westinghouse Hevi-Duty Mill Motor the most rugged package of power you can buy.

New silicone insulated armatures and the exclusive Westinghouse solid mass design with multi-dip finishing make it five times tougher for load surges to affect armature coils.

Maintenance is easy, too. New openings in lower frame give quick, easy access to commutator and brush rigging for inspection or repair. Silicone-insulated armatures and field coils are interchangeable with old-style units.

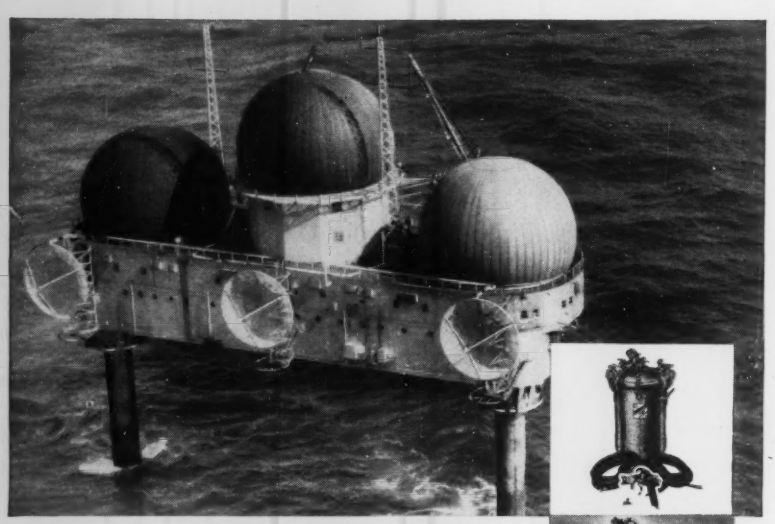
For complete information on the outstanding Westinghouse Hevi-Duty Mill Motor, call your Westinghouse sales engineer. Or, write Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pennsylvania. Ask for B-6547. J-22049

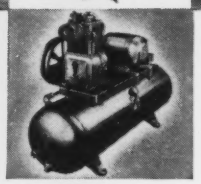


WESTINGHOUSE ALSO OFFERS:
The Only Self-Adjusting D-C Magnetic Brake

When selecting mill motors remember that Westinghouse can furnish motors and brakes as one unit. Only Westinghouse D-C Magnetic Brakes are self-adjusting. This exclusive self-adjustment design means long brake life and minimum maintenance. For more information on the only Self-Adjusting D-C Magnetic Brake on the market ask for B-6548.

YOU CAN BE SURE...IF IT'S Westinghouse





Maintenance of machinery and hull against the ravages of wind and sea is a must for our Texas Tower air defense radar outposts. Aboard this and other Texas Towers, Binks spray painting outfits similar to this are used for maintenance painting and coating.

on each Texas Tower...

Binks spray painting outfits help fight the spray of the sea

Texas Towers are men and steel, matched against the might and muscle of the sea...the savage elements of nature. Their mission is to maintain a never-ending radar vigilance against the possibility of enemy air attack...to provide our own combat aircraft a few precious additional minutes.

All activity aboard the Texas Towers is aimed at keeping the electronic gear functioning at top efficiency. A vital part of this activity is protecting all weather-exposed surfaces and interior spaces from deterioration. We are proud to say that the paints and coatings used for this purpose are applied with Binks spray painting outfits.

Integrated equipment

Binks spray painting outfits are carefully integrated packages... spray gun, hose, pressure fluid tank and air compressor are designed and combined to function as an easy to use, completely dependable unit.

As a matter of fact, all of Binks 1100 plus items of spray painting and coating equipment are designed for fully integrated operation.

Complete information

If you would like a copy of Binks Catalog 956, it is yours for the asking. Or, if you wish assistance on any spray painting or coating problem, manual or automatic application...call your nearest Binks Branch Office or write direct to the address below.

Ask about our spray painting school
Open to all...NO TUITION...covers all phases

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SPRAY PAINTING

SPRAY GUNS

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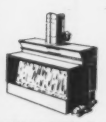

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CO SAFETY STRESSED . . .

regularly distributed to supervisors and used as topics at foreman-employee safety meetings.

Safety by Detection—Employees are taught how to detect dangerous gas conditions. A Colorimetric Tester that can be effectively operated by a man after five minutes of instruction is used for routine gas detection.

A Carbon Monoxide Alarm is installed in areas where experience has shown a recurrence of gaseous conditions.

This instrument sounds a loud horn. It can be set for carbon monoxide concentrations ranging from as little as 100 parts per million to 400 parts per million.

It can be wheeled to any work area where the disruption of dust or the opening of supposedly purged tanks creates a potential hazard.

Safety by Inspection—At the beginning of each shift, the safety engineer on duty checks the weather report for adverse conditions. He makes gas checks in selected locations in the blast furnace and coke oven area at least twice during his shift.

Any abnormal gas concentrations are reported immediately to the operations general foreman.

Use of Equipment—In the gas school, the employees are taught the proper use of the oxygen breathing apparatus.

Instructed employees, wearing standardized oxygen breathing apparatus, are placed in an airtight room. There they are conditioned to working in gaseous atmospheres by performing routine bench work under varying gas conditions.

A number of well adapted employees are selected for accelerated training and serve as a rescue squad.

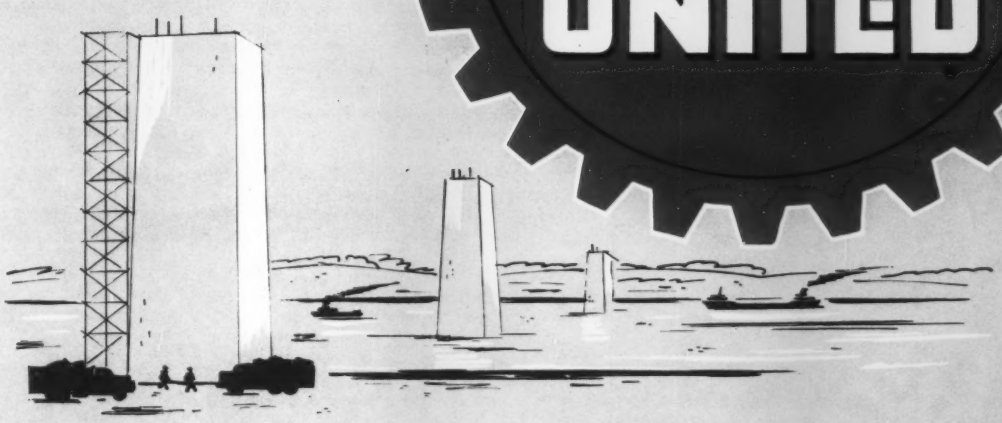
Special carts containing multiple lengths of hose, three oxygen tanks equipped with four-man manifolds and a closed cabinet for sterilized work masks have been stationed throughout the blast furnace and coke oven area.

In those areas where a workman cannot enter without having first donned an oxygen mask, such as the various blast furnace levels, permanent oxygen lines have been incorporated in the furnace structure.

CONTINUOUS BAR MILL

Designed and Built by

UNITED



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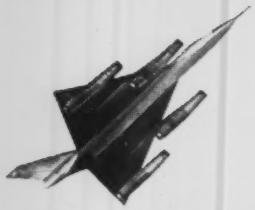
UNITED *can serve you no matter where in the world you are*

"THE CRUX OF THE HONEYCOMB SANDWICH WILL ALWAYS BE THE BOND"



*B-58 bomber designed and built by the Convair Division of General Dynamics Corporation, Fort Worth, Texas.

B-58 engine nacelle section. Stainless steel honeycomb structure whose light weight is evident. Its strength and aerodynamic qualities are attested to in flight in the world's fastest jet bomber.

This is a direct quote from a recent article on honeycomb structures in *Aeronautical Purchasing* magazine. It states exactly what authorities in the field of supersonic speeds already know, and clearly points up the aims and activities of Handy & Harman in this critical and challenging field.

One of the most significant applications of the honeycomb sandwich can be found in the United States Air Force new supersonic bomber, the B-58.* Elements of this "missile with a man in it" are made of high-strength stainless steel honeycomb sandwich, *bonded* with Handy & Harman special silver brazing alloys – a method which permits honeycomb assemblies of virtually any size.

The honeycomb principle needs no further testimonial. Indeed, the problems it solves and the obstacles it overcomes *now* can mean only that its future is immensely promising. Work with all kinds of materials; metals, ceramics, plastics, paper, etc., is now in progress to further increase its present great values.

Handy & Harman, with its knowledge and facilities in the field of joining metals, can be of great help to you in many of these honeycomb sandwich research areas. Many of the developments in silver alloy brazing, heating methods, production techniques and the formulation of special alloys for special needs, were originated by Handy & Harman. Your efforts in devising new methods in metal joining and in meeting present bonding needs can be helped, in large measure, when you call on Handy & Harman.

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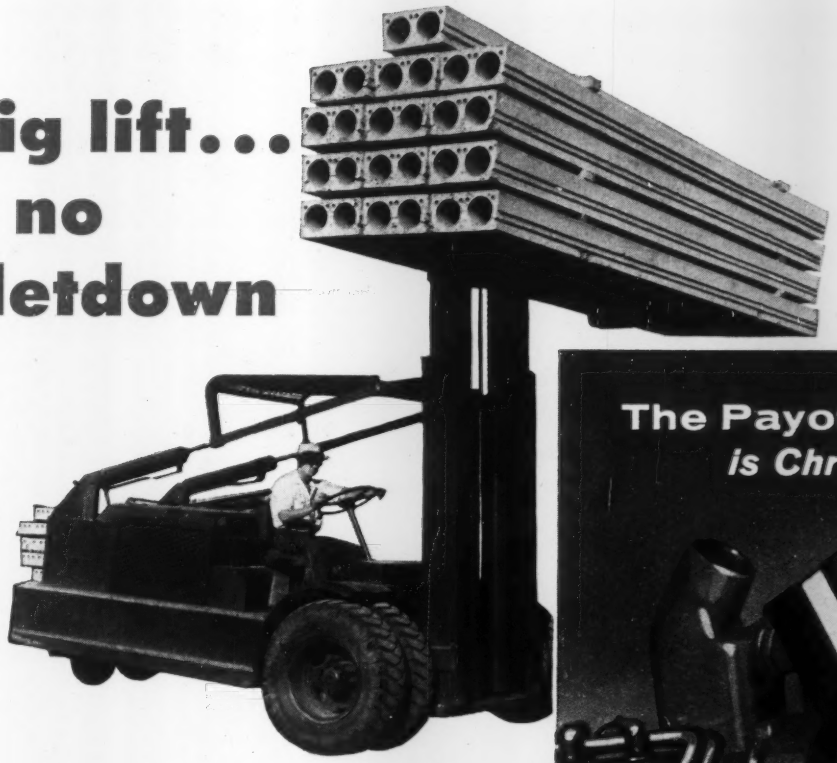
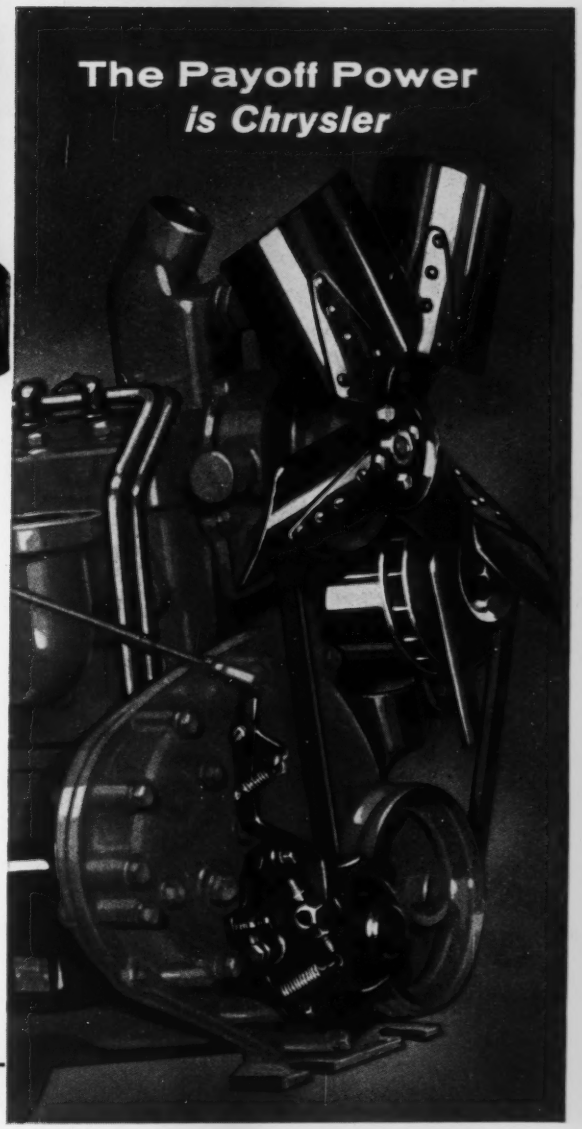
big lift... no letdown





Erickson power lift trucks have a capacity up to 20,000 lbs.! To assure balanced weight distribution—with no letdown in efficiency—special ballast is shifted hydraulically from front to rear of the truck. To assure dependable, trouble-free power—with no letdown on the job—Erickson chooses Chrysler Industrial Engines.

CHRYSLER INDUSTRIAL 33, in-line 6 Engine (265 cu. in. displacement) powers the Erickson Power Lift Truck and many other makes of equipment in the construction and materials handling fields. There are four Chrysler in-line 6s, two V-8s—ranging from 230 to 354 cu. in. displacement.

Chrysler

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Write Dept. D7, Industrial Engine Division, Chrysler Corporation, Detroit 31 Michigan, or see your nearest Chrysler Industrial Engine Dealer.

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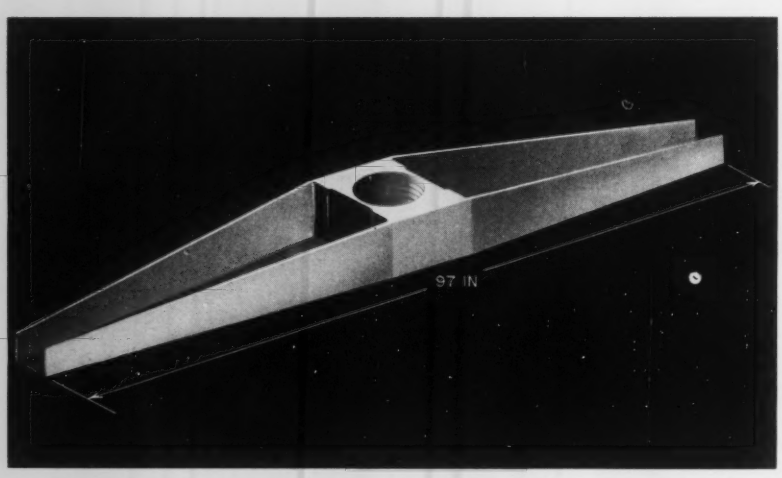
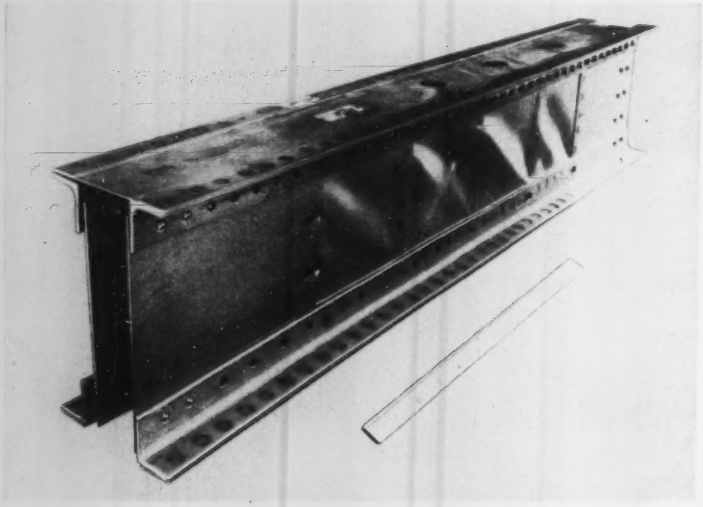
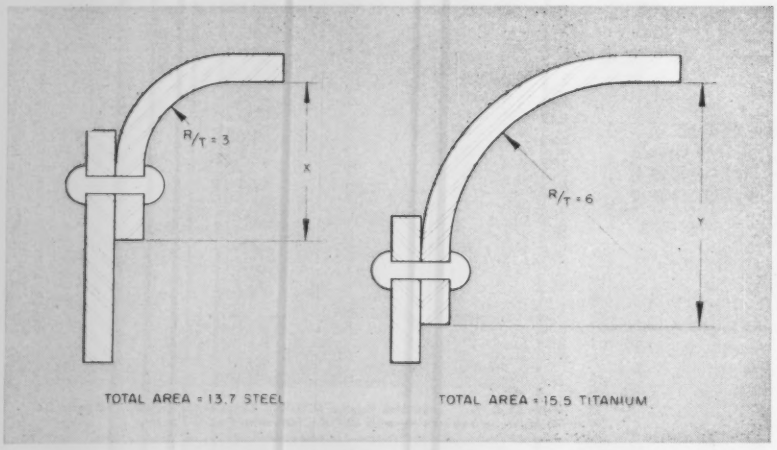


Avoid forgings with thick sections like these. Properties are unpredictable at center, require careful heat treatment

New answers to fabricating problems are needed fast, says this leading missile maker. Here are a few of his solutions for flight temperatures developed between Mach 2 and 4

Missile Design





This is the effect minimum radius has on weight: The larger the radius, the heavier the part. That's why box beam (above) is lighter when made with extrusions rather than formed angles. Distance between rivet hole and edge of sheet must not be less than two times sheet thickness

TITANIUM fills a metallurgical gap for missiles which fly between two and four times the speed of sound.

It's one solution to high temperature failures, says A. T. Mociun, metallurgical engineering head, materials research of North American Aviation's Missile Development division, Downey, Calif. That's what keeps the metal growing despite cost and formability obstacles. Here's how designers are handling its problems in today's missile structures.

How It Saves — Titanium is stronger by weight than other metals, a feature that takes advantage of what designers call the "snowballing effect." It means that for every structural pound of weight saved, you can cut 8.5 lb from the flying weight of a missile.

Problem	Solution
Low peel strength of spotwelds	Rivet the ends of each row.
Doubtful metallurgical properties of large cross sections	Heat treatment, substitute weldment or make subassembly.
Large bend radiuses (larger in newest alloys)	Substitute extrusions for formed sheets, hot or creep forming, substitute welded angles.
Low electrical and thermal conductivity	Plating, cooling systems.

Spurs Titanium's Growth

Example—A 50-lb steel fitting was redesigned for titanium. The new part weighs 30 lb, saving 170 lb in the completed missile. If its structure costs $30 a pound, the titanium forging could come to $5100 without adding to the original cost.

Intricate forgings still present a cost problem. Take the wing spar in the picture above (left). Forge shop experience with such a shape is limited; machining the part from a billet is costly (chips alone run more than $6500). The solution: A two or three piece assembly joined by fasteners or welds.

Forging, Extrusion—Guarantees of the physical properties of today's alloys depend on section size. The larger the cross section, the more questionable are its annealed properties.

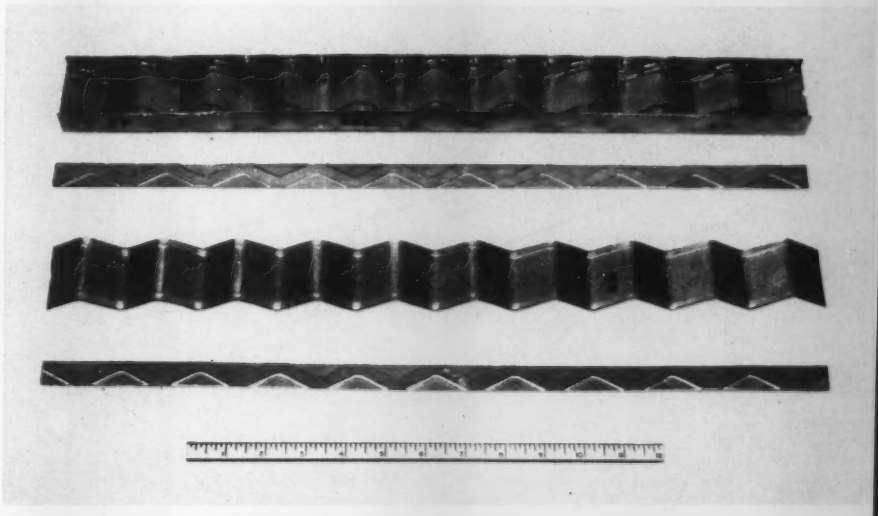
Transverse properties such as ductility also depend on section size. Designers must specify mechanical properties for each heavy section or part machined from a large billet.

Extrusions combined with sheets, rivets and welds offer another detour around titanium's shortcomings. In the box-beam frame (page 148), they replace simple, brake formed angles which weigh more. Here's why: Minimum bend radiuses are limited to not less than 3.5 times material thickness. Tomorrow's alloys won't be much better, with limits between four and six times material thickness. Extrusions have no such limitations.

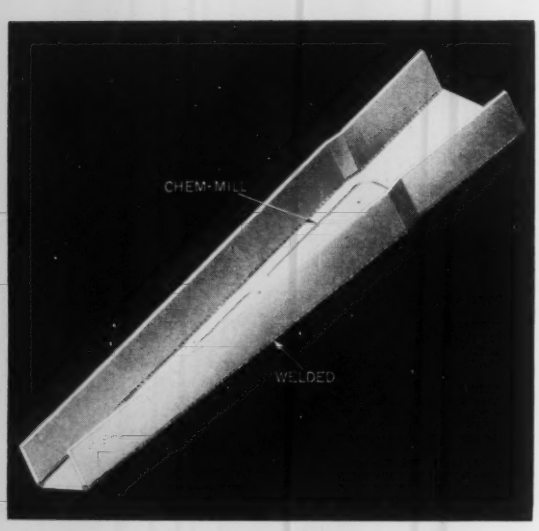
Alternate Methods—The problem of minimum bend radius can also be solved by hot and creep forming sheets. Designing the frame cap (box-beam illustration, page 148) as a welded angle eliminates the radius altogether.

Titanium weldments play an important part in missile construction. The aerodynamic test section (below) is an unusual example. Joints are completely accessible for shielding on both sides —a knotty problem for most designers.

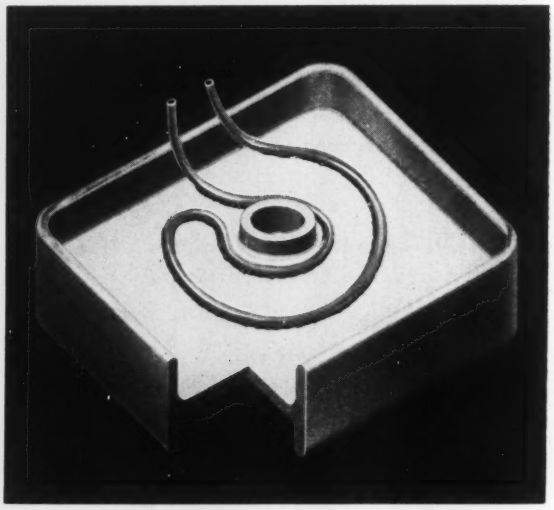
The welded construction in the rib and channel section shown on the following page eliminates large radiuses. Chemical milling was



Wing test section such as this one is easy to weld. Both sides can be shielded with inert gas. Some structures can't be shielded—another joining problem for the designer



Flanges are welded to this rib section which is chemically milled to reduce weight. Titanium welds are as strong as parent metal



Titanium doesn't conduct heat well, so bearing supports are cooled. Titanium cooling tubes above are brazed to support

used to reduce weight in three lower stress areas of the web. The part is equal in strength to a formed part since titanium welds are as strong as the parent metal.

One drawback: Not all alloys are suitable for welding.

Brazing — Titanium is used for cooling tubes and heat exchangers in missiles. It's far from ideal because it doesn't conduct heat well. But designers have no choice where temperatures are too high for aluminum or where tubes must be bonded to titanium parts.

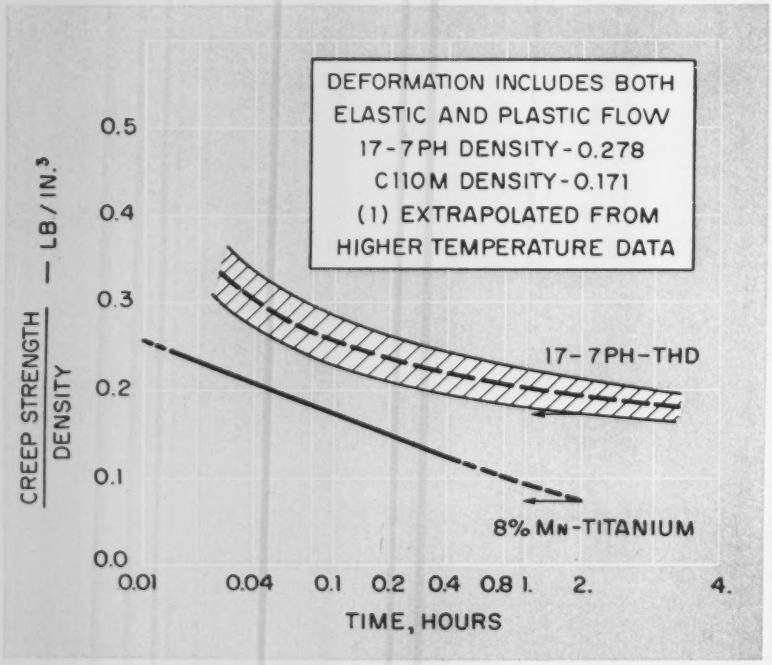
The bearing support fitting (above) is brazed to its cooling tubing. Two problems are involved: 1. The brazing alloy must melt at some point below the beta transus of the titanium fitting. 2. It must not combine with the titanium to form a brittle alloy.

In such designs, the strength requirement is low, eliminating the need for extensive testing.

Brazing is helping missile designers even though all problems haven't been solved. It's being used in the electrical and electromechanical systems of missiles. Most joints are between austenitic or ferritic stainless and titanium.

Induction heaters are used since components are small. Protection is simple: Parts are placed inside a glass or plastic container purged with shielding gas. Embrittlement is no problem since heating time is short enough to minimize diffusion of the brazing alloy.

Mechanical Properties—In most cases, a structure must not deform more than 1 per cent at working temperature and stress. The deformation, called creep, of heat treated 17-7 PH and the 8 per cent manganese-titanium alloy is plotted at the left. It shows that the 17-7 PH structure has superior resistance to creep at 900°F, the



This graph compares the creep strength of 17-7 PH stainless and an 8 per cent manganese-titanium alloy. It shows why 900°F (Mach 4) is the practical upper limit for titanium applications

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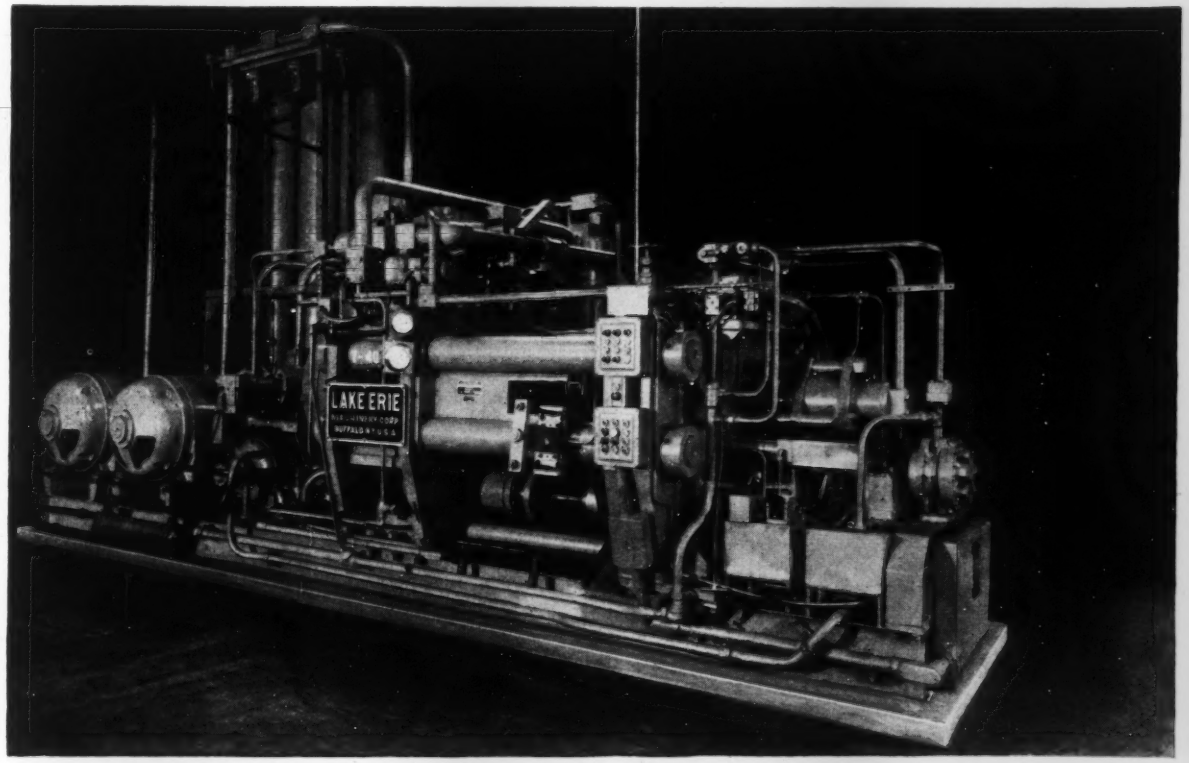

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approximate flight temperature of Mach 4 (the upper limit of titanium's usefulness).

The latest alloys contain aluminum (6Al-4V and 5Al-2.5Sn). They have improved creep resistance.

Heat — Titanium's thermal expansion characteristics offer no problems to the designer. You must determine operating conditions before you can measure their influence.

Structures made from 17-7 PH and titanium expand at about the same rate. The designer does not have to build to compensate for induced stresses.

Not so with a structure which combines titanium and half-hard stainless. An 87 per cent difference in thermal expansion is large enough to justify an increase in metal (gage) thickness.

Electrical — Guidance and communication systems account for much of the missile's weight. Their strength is less important than their weight. Titanium is successful here, although its poor conductivity (less than 3 per cent that of copper) requires compensation.

Titanium was tried in the antenna cavity of a high frequency telemetering system. Power requirements dropped to one-half the minimum. To increase power by upping transmitter output would have quintupled weight.

The designer solved the problem by plating the antenna cavity with gold. He got top conductance at a slight increase in cost.

Mechanical — The missile designer must take into account more than tensile and yield strengths. Tensile failures can be brittle or ductile. Compression failures can be block, column or crippling types.

In a normal missile, 10 to 15 per cent of its structure is in tension. More than 50 per cent is subject to buckling. The rest is supported by columns or compression members.

Material efficiency is affected by temperature, shape, loading and material properties. The designer must juggle them all if he is to get the most out of the newer titanium alloys, some of which are not yet fully tested.

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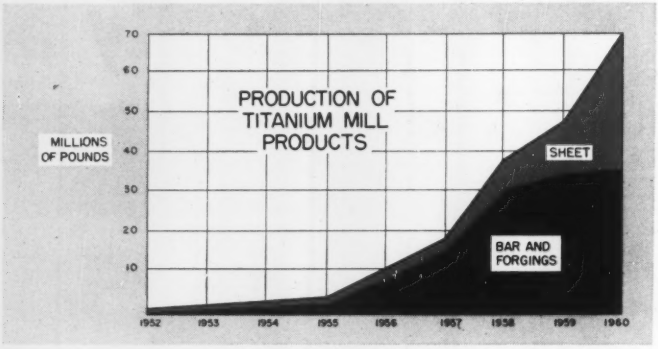
* *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



Titanium Production Surges Ahead

By FRANK H. VANDENBURGH
Vice President & General Manager
Mallory-Sharon Titanium Corp.
Niles, O.

THE TITANIUM product mix is changing (see chart). Five years ago, nearly all the material sold was flat rolled, commercially pure stock. Now, nearly 70 per cent is rods, bars and billets; about 90 per cent is alloy.

Projected product demand curves show that by 1960 or '61, the mix will change again —50 per cent of the output will be flat rolled, high strength, heat treated sheets. By 1965 or 1968, we will be using considerable quantities of commercially pure, flat rolled stock because of its resistance to corrosion.

Price—In the last two years, prices of mill products have been cut several times. As volume increases, and as special equipment is brought into production, further reductions will be possible. It's probable that the industry will produce mill products for about $2 a pound —on a capacity of several hundred thousand tons a year.

One of the big problems facing the industry is the lack of proper mill facilities to produce the type of products required. Equipment being used was designed for steel.

Equipment — Special equipment is needed to produce large, flat sheets and close tolerance rod and bar products which have satisfactory properties in large sections.

Heat treating facilities for operations such as quenching, aging and vacuum annealing are emerging, but equipment that does a satisfactory job at low cost must be developed.

Fabrication—To solve fabrication problems, fabricators and producers will have to work together. Titanium honeycomb is a good example. Producers must develop an alloy that can be rolled thin yet be suitable for fabrication.

Research is moving toward the development of such new alloys. The fundamental metallurgy of the metal is getting a good look.

Rods, bars and forgings can be supplied at strengths of 50,000 to 200,000 psi ultimate tensile and in flat rolled products with 50,000 to 175,000 psi ultimate tensiles.

Research efforts must be stepped up if titanium is going to find its place in many nonmilitary applications such as reactor vessels, piping and process equipment. Alloys must be found that have good stability and properties at 1000°F and over. Materials are needed for tubing used in the expanding nuclear energy field.

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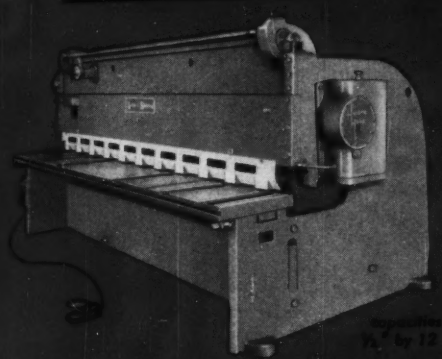

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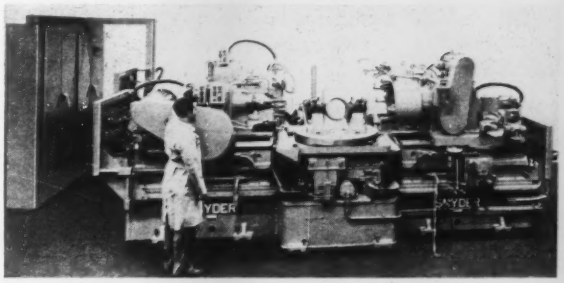
The flexibility is provided by mounting the part in a fixture with a built-in index table.

Pushbutton controls index the fixture back and forth between stations for the machining operations. The fixture is rotated according to a program sheet.

Quick change adapters speed the 28 tool changes. *Write*: Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich. *Phone*: Lorain 7-0123



Welding Wire Feeds Through a Flexible Cable

Tube wire feeds into the welding zone at a controlled rate. It is governed by a drive motor, gear unit, pressure and feed rolls and voltage controller.

Welding wire is mounted on four-fingered wire reels. The starting end of the 25-lb coil is inserted through the feed roll guide into the rolls.

After starting the feed motor, the wire is advanced through the flexible shaft and out the hollow electrode holder in less than 30 seconds.

Blowing the machine and flexib'e shaft clean with dry compressed air after each job is the only maintenance normally required. *Write*: Amsco Division, American Brake Shoe Co., 230 Park Ave., New York, N. Y. *Phone*: Oxford 7-7000

Positioning Table Is Controlled by Tape

This table is used with a multiple spindle turret drill to obtain flexible prototype and production operation.

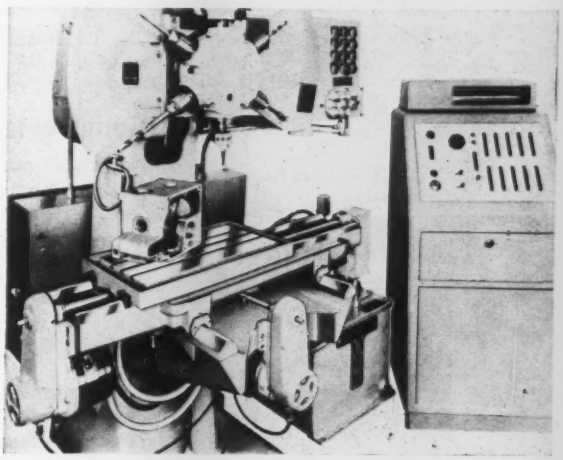
Each spindle is controlled to assure the correct speed, feed and depth.

Controls include a tape reader and command unit, comparison unit, servocontrol, table drive unit, digitizer and display.

Tape is manually punched in decimal form in two rows. The left section is for X and Y positions and the right section designates the turret sequences.

The digital measurement is determined only by the machine position and is independent of past movements, power failure or where the machine is started.

The 12 x 22 in. table has a travel of 10 x 18 in. *Write*: Burg Tool Mfg. Co. Inc., Gardena, Calif. *Phone*: Davis 9-4158



NEW PRODUCTS and equipment

Precision Boring

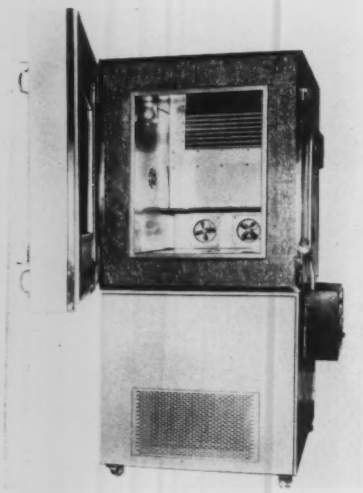
Boring, turning, chamfering and other operations can be performed with this machine using multiple cutter heads.

The vertical design incorporates two spindles. Two pieces are finished per cycle.

The photograph shows boring of electric motor end shields at the rate of 720 pieces an hour. The operation is automatic except for loading and unloading. *Write*: Wadell Equipment Co., 159 Terminal Ave., Clark, N. J. *Phone*: Fulton 1-0400

Temperature Test Unit

Single stage and cascade refrigeration systems are used in this 10 cu ft temperature test chamber.



Temperature ranges are −40, −85, −100 and −120°F in the low region and 240 and 350°F on the high side. *Write*: Environmental Division, Tenney Engineering Inc., 1090 Springfie'd Road, Union, N. J. *Phone*: Murdock 6-7870

Flowmeters

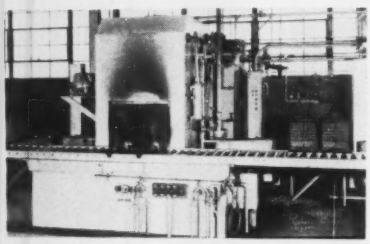
These instruments give a visual check of the flow rate for inert gas welding, flushing molten metals and laboratory service.

A piston type selector valve permits in-service switching from one of the two ranges to the other. The flow rate in both ranges is controlled by a needle valve.

A combination of two or more flowmeters can be used to proportion a mixture of gases. *Write*: Air Reduction Sales Co. Division, Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 2-6700

Heat Treating Furnace

Carburizing, carbonitriding, carbon restoration and clean hardening from 1450 to 1700°F are performed in this controlled atmosphere furnace.



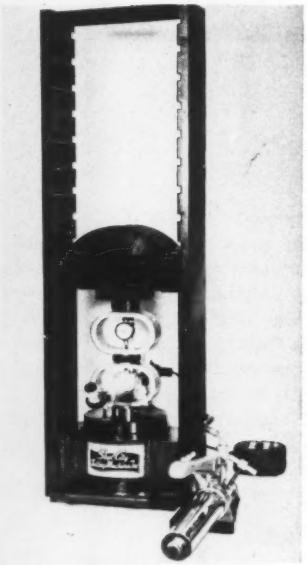
A full furnace load of four 14 x 18 x 22 in. work containers is batch processed and quenched at one time. *Write*: Dow Furnace Co., Detroit, Mich. *Phone*: Kenwood 2-9100

Compression Tester

A hand pump furnishes a compressive testing force up to 150,000 lb. The tester weighs 170 lb and has handles for moving by two men.

Any vertical dimension between 9½ and 32 in. can be obtained. The width between the uprights is 11 in.

For normal compression testing purposes a gage is mounted to the rear of the pump. *Write*: Steel



City Testing Machines Inc., 8817 Lyndon Ave., Detroit 38, Mich. *Phone*: Webster 3-3500

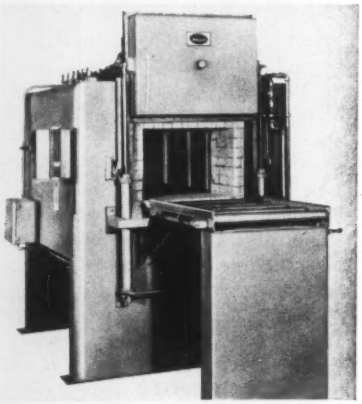
Steel Studs

These studs are used in tool and die work for machine and fixture setup. They have tensile strengths over 125,000 psi.

They are double drawn and heat treated. Diameters range from ¼ to 1 in. and the lengths come in ¼-in. multiples up to 12 in. *Write*: Jergens Tool Specialty Co., 712 E. 163rd St., Cleveland 10, O. *Phone*: Ivanhoe 6-2100

Tempering Furnace

Tempering operations at a maximum temperature of 1400°F are made in this furnace. If a cooling chamber is used, the work passes straight through. Units without



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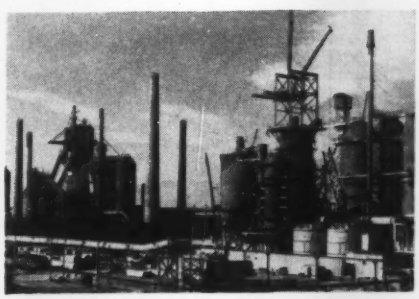

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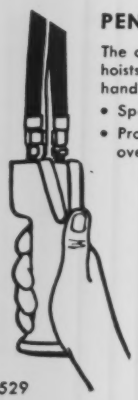

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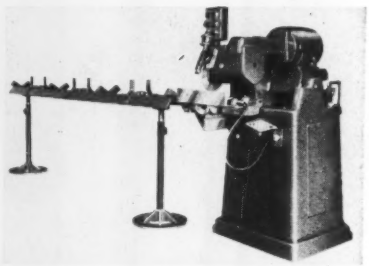
the cooling chamber use the same door for loading and unloading.

The furnace has a complete instrument panel with a strip chart controller, excess temperature cutoff, motor starters and switches. An endothermic flow gage with built-in adjusting valves is mounted and piped to the furnace. *Write*: Eclipse Fuel Engineering Co., Rockford, Ill. *Phone*: 8-3751

Pipe Cutters

These air operated machines are cycled manually, semiautomatically or automatically. Type of operation is selected by setting a switch on the control panel.



A handwheel assembly on the back of the unit provides the only adjustment necessary for change in diameters.

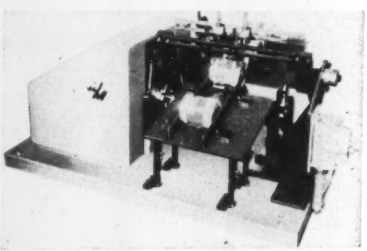
These roller type pipe cutters are powered by 5-hp motors. *Write*: Landis Machine Co., Waynesboro, Pa. *Phone*: 1600

Cylindrical Marker

Color, contents and tradenames can be imprinted on cylindrical objects by this machine. It prints up to 70 units a minute.

The intake chute has an escapement which positions the containers in printing position. Controlled ejection permits continuous flow into the packing lines.

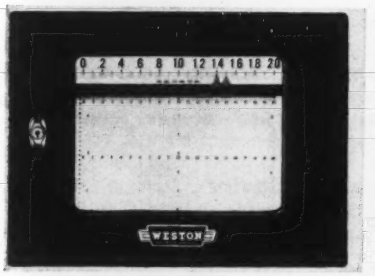
Imprints can be made all the



way around the container. *Write*: Markem Machine Co., Keene 68, N. H. *Phone*: Elmwood 2-1130

Electric Controllers

These chart recorders are used for measuring and controlling temperature, speed, millivolts, pH and conductivity.



The small case allows three of these units to be mounted in the space normally occupied by two.

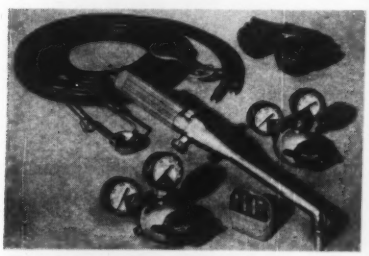
Plug-in clips facilitate range changing in the field. Full throttling and time proportioning control are possible, both with automatic reset and approach rate. *Write*: Weston Electrical Instrument Corp., Newark 12, N. J. *Phone*: Bigelow 3-4700

Oxyacetylene Welder

This outfit welds, cuts, heats, and brazes without a cutting attachment.

It welds up to 3/8-in. and cuts up to 2 in.

The oxygen lever is on the top of the handle where it can be turned on or off with the thumb.



A green plastic ring around the oxygen valve and a red ring around the acetylene valve provide quick, positive identification. *Write*: Linde Co., division of Union Carbide Corp., 30 E. 42nd St., New York 17, N.Y. *Phone*: Murray Hill 7-8000

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NEW literature

Write directly to the company for a copy

Buckets and Hoppers

Ten types of buckets and hoppers are described in this 4-page bulletin. It includes a table of weights of various materials. Penn Iron Works Inc., Reading, Pa.

Lift Trucks

Bulletin BU-450, 4 pages, gives specifications for lift trucks, towing tractors and platform trucks. It includes a load rating chart. Buda Division, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Cranes

This bulletin, 15005-1-57, specifies the type crane needed for a particular use. It covers crane capacities through 20 tons and 80 ft spans. Manning, Maxwell & Moore Inc., Muskegon, Mich.

Surface Grinders

A cooling system for use in close tolerance work with surface grinders is described in this bulletin. Thompson Grinder Co., Springfield, O.

Surface Finishes

Surface characteristics, stylus type measurements, roughness comparison and precision specimens are included in this bulletin, 24 pages. Brush Electronics Co., 3405 Perkins Ave., Cleveland 14, O.

Air Filter

Removal of moisture, oil, dirt and fine scale from compressed air lines is described in this bulletin. Aridifier Division, Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill.

Surface Treatment of Metals

An 84-page booklet covers rust prevention, mechanical and chemical cleaning, blackening and phosphating. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Propeller Fans

Tables for estimating air handling requirements, entrance and elbow losses and duct sizes are included in this 24-page bulletin, E 57. Aerovent Fan Co., Piqua 69, O.

Hose Connection

A short radius connection using swivel fittings is explained in this bulletin, 27. Aeroquip Corp., Jackson, Mich.

Electroplating

Ways to improve electroplating are discussed in this 12-page bulletin. Metal Industries Department, Diversey Corp., 1820 W. Roscoe St., Chicago 13, Ill.

Structural Steel Paints

Technical information and paint formulations for the protection of steel in many uses and conditions are given in this bulletin. Lead Industries Association, 60 E. 42nd St., New York 17, N.Y.

Recorders

This bulletin, MSP-141, explains a line of recorders, indicators and controllers. Hagan Chemicals & Controls Inc., 323 4th Ave., Pittsburgh, Pa.

Valve Actuator

The actuator described in this 4-page bulletin, 38.3, is used with low level alternating or direct current signals from electronic controllers. Askania Regulator Co., 240 E. Ontario St., Chicago 11, Ill.

Machining Steel

The properties of a steel for machining are given in this 8-page bulletin. It includes a tensile property

A Farewell to
CADMIUM
BLISTERS
See these blisters? We have to scrap almost all these parts. We're not getting the cutting oil off in the spray washer.
Hi, Jack, looks like I got here just in time!
"Say, Burt, how did Pennsalt develop this cleaner?" "Well, Jack, nobody knows more about metal-processing chemistry than Pennsalt. Our Whitemarsh Research Lab is constantly working on problems like yours, and Cleaner 38 is just one of their outstanding successes. By the way..."
. . . you can store these parts for a day or so before putting 'em on the plating line. The unrinsed cleaner film will prevent rusting.
Fine—I won't have to keep both lines running together now.

NEW LITERATURE

chart. Horace T. Potts Co., Erie avenue and D street, Philadelphia 34, Pa.

Air Chuck

This 82-page catalog, P.O. 65, is a reference to chuck or cylinder descriptions, dimensions, part lists, accessories and general information. It describes air cylinders and accessories as well as air operated chucks. Cushman Chuck Co., Hartford, Conn.

Socket Screws

Standard socket screw products, pressure plugs, and dowel pins are described in this 32-page catalog. Size-by-size data on diameters, thread specifications, and lengths are included. Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

Motors and Heaters

Bulletin GEA 6645, 4 pages, describes motors for machine tools requiring frequent stops. These motors range from 1½ to 125 hp. Bulletin GEA 5866, 16 pages, gives the case histories of tubular heaters used by machinery manufacturers. General Electric Co., Schenectady 5, N. Y.

Plant Equipment

This 8-page bulletin, G3-B60, describes a line of equipment that includes ball-rod mills, grinding systems, filters, vibrating screens and tanks. Denver Equipment Co., P.O. Box 5268, Denver 17, Colo.

Vacuum Valves

This 32-page catalog illustrates a line of high vacuum valves. Requirements imposed by high vacuum service are discussed. NRC Equipment Corp., 160 Charlemont St., Newton 61, Mass.

Drives and Couplings

Photographs, drawings and tables listing various motor sizes for use with drives and couplings are given in this 4-page bulletin. Dodge Mfg. Corp., Mishawaka, Ind.

Thread Sealant

Here's a 4-page bulletin describing a liquid plastic sealant for threaded fasteners. American Sealants Co., 103 Woodbine St., Hartford 6, Conn.

Motors and Drives

Alternating and direct current motors, gearmotors, motor-generator sets, motor controls and adjustable speed drives are covered in this 8-page bulletin. Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, O.

NEW BOOKS

Machine Tools—What They Are and How They Work, Herbert D. Hall and Horace E. Linsley, Industrial Press, 93 Worth St., New York 13, N. Y. 436 pages, $5.50

Here is an explanation of the important factors in modern mass production. The basic elements of various types of machine tools, their function and use in the production line are described. All phases of metalworking are covered for the student or general reader.

Boron, Calcium, Columbium, and Zirconium in Iron and Steel, R. A. Grange, F. J. Shortsleeve, D. C. Hilty, W. O. Binder, G. T. Motock and C. M. Offenhauer, John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N. Y. 533 pages, $14.

Here are four monographs which collect the scattered data (published and unpublished) on these alloying metals.

Well, Burt Adams from Pennsalt! Can you keep our cadmium plate from blistering?
You need our new, low-foaming alkaline spray cleaner. I'll have a drum here tomorrow.
NEXT DAY...
What! Do we use only half as much as the old cleaner?
That's right, Jack. Pennsalt Cleaner 38 keeps your costs in line, besides being the end to your blistering troubles.
A WEEK LATER...
Hi, Burt. Yeah, the blisters are gone—we haven't sent more than two parts back since we switched to Pennsalt spray cleaning. Now—how about giving me a Pennsalt electro-cleaner?

Blistered plating is just one finish problem Pennsalt can solve for you. Let the Pennsalt salesman help you achieve "A BETTER START FOR YOUR FINISH." Send the coupon today.

Pennsalt Chemicals

Pennsalt Chemicals Corp., Dept. 507
3 Penn Center, Phila. 2, Pa.

Send me information on Pennsalt ☐ metal cleaners
☐ phosphate coatings ☐ cold-working lubricants

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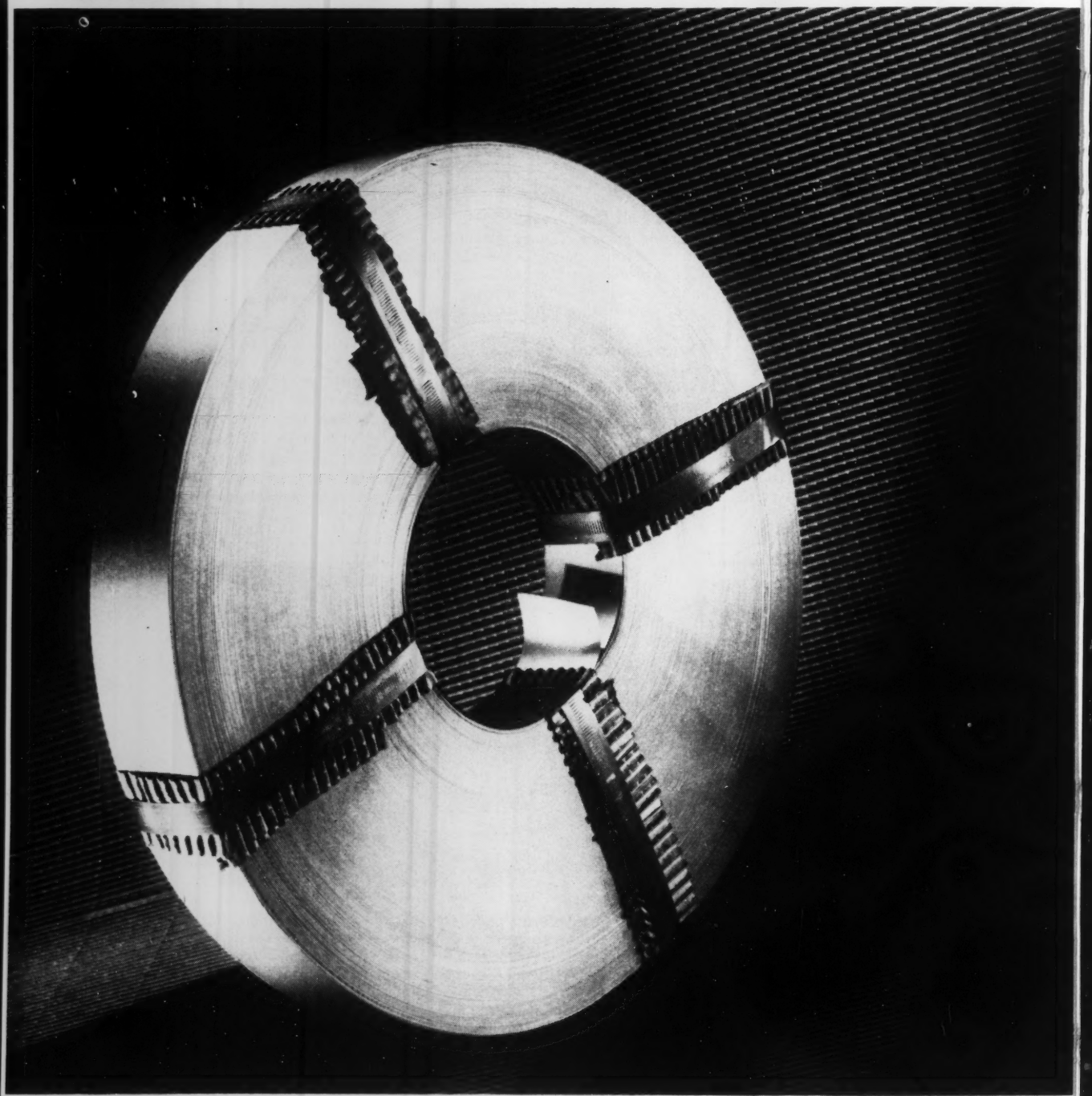
CMP RESTRICTED SPECIFICATION COLD ROLLED STRIP STEEL



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Three plants with facilities in Youngstown, Indianapolis and Los Angeles, for the production of restricted specification cold rolled strip steel. *CMP PRODUCTS: Low carbon, high carbon—annealed or tempered, stainless, alloy, electro zinc coated.*

THE COLD METAL PRODUCTS CO.
GENERAL OFFICES: YOUNGSTOWN 1, OHIO
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CMP

STEEL

July 29, 1957

Market Outlook

ALTHOUGH demand continues spotty, steel market sentiment appears to be improving. Buying is a little better this month than had been expected. It will be still better next month.

While current volume is relatively light, producers anticipate a strong fall pickup.

AUTOS HOLD KEY—Steelmakers are pinning their hopes for an active fall and winter on a sharp revival in automotive requirements. They also look for a substantial pickup in appliance needs and an improvement in requirements on general account.

NEW MODELS—Public reception of the new model cars will point the way to steel market activity over remainder of this year. So far, there's little indication as to what requirements will be for the 1958 model runs.

Present automotive steel acquisitions are largely for just enough tonnage to complete 1957 schedules. Generally, volume automotive buying is expected to start late next month.

APPLIANCES SLUGGISH—Purchases of steel by appliance manufacturers continue disappointing. Since their steel inventories are low, they are expected to do some buying for stockpile over the coming months.

Some steelmakers think November and December may be the peak demand months of the next 12.

LOOKING AHEAD—Most steel market observers are confident that the automotive industry will be running at capacity from September through December to stock dealers and build up a substantial inventory. They say that if sheet supply doesn't tighten up in the last quarter of this year, there probably won't be any supply squeeze next year.

For most products, availability will likely exceed demand. Even in structurals and plates, increased capacity will make for easier supply conditions over coming months. There is reason to believe that both items will come into reasonable supply-demand balance by the end of this year. Strip-plate is already plentiful.

OTHER PRODUCTS—Demand for galvanized sheets is off substantially, but some makers say volume is not down as much as they had anticipated. Galvanized formerly was used chiefly in roofing, siding, gutters, downspouts and farm products. An increasingly larger portion of output is now going into ducts for air conditioning and heating.

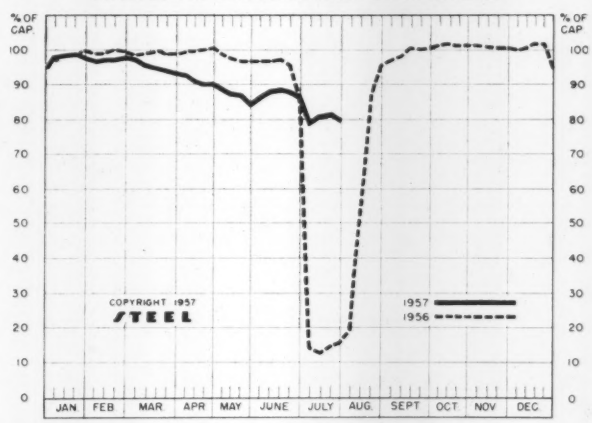
Tin plate sellers are under less pressure currently, but this is due more to increased capacity than to reduced consumption. Steel bar bookings for August shipment are not up to expectations, but the trend is upward.

PRICES REVISED—Scrap prices continue to ease. STEEL's composite on the steelmaking grades dropped for the fourth consecutive week. At $54, it's off another 33 cents.

Steel producers are still revising their price schedules in line with the changes initiated by U.S. Steel Corp. at the opening of this month. STEEL's arithmetical composite on finished steel is stabilized at $146.19.

PRODUCTION SLIPS—Steel ingot output declined 1.5 points last week to 79.5 per cent of capacity. July tonnage will be the smallest for any nonstrike month since February, 1955.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

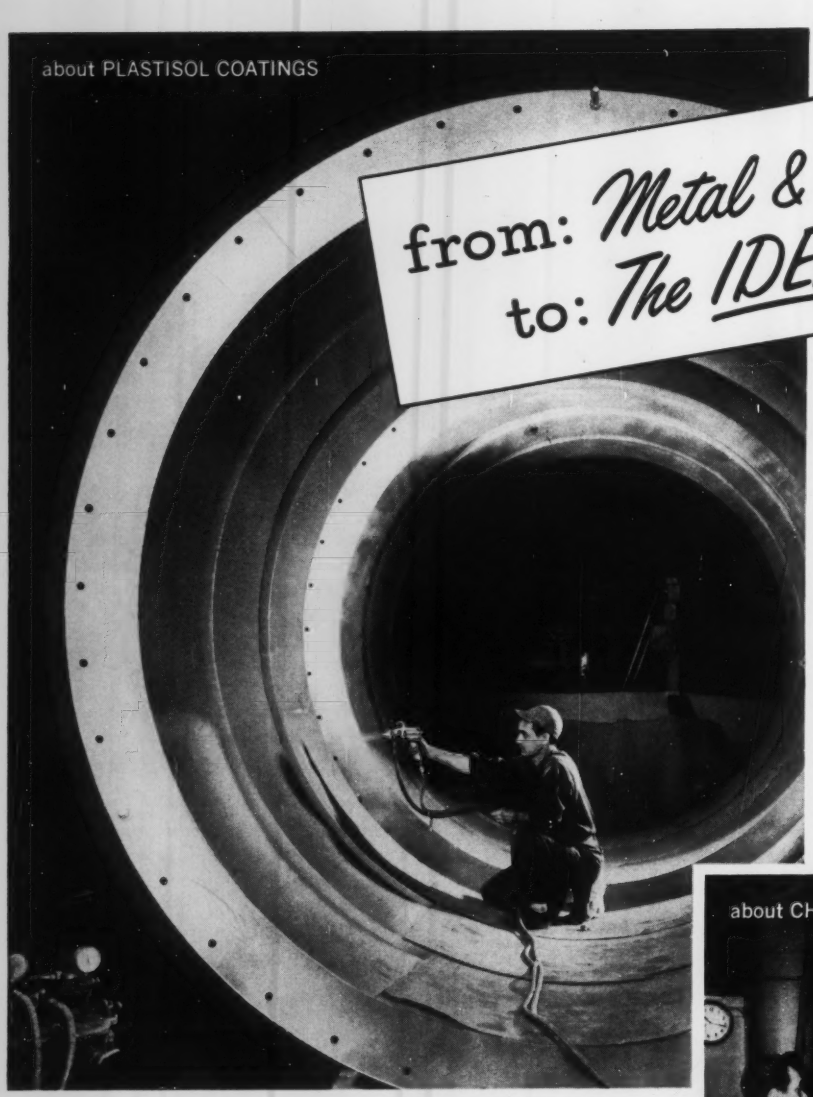
	Week Ended July 28	Change	Same Week 1956	Same Week 1955
Pittsburgh	88	+ 4.5*	2	95
Chicago	83.5	— 0.5	5.5	94
Mid-Atlantic	88	— 2	10	94
Youngstown	77	— 2	5	98
Wheeling	70.5	— 6.5	57	92.5
Cleveland	75	— 3*	0	92
Buffalo	90	+ 2	0	105
Birmingham	87.5	— 4	3.5	93.5
New England	55	+ 5	39	82
Cincinnati	61	— 1*	76.5	86
St. Louis	79	— 5.5	95	97.5
Detroit	86	0*	48.5	89.5
Western	100	+ 1	32	101
National Rate	79.5	— 1.5	15.5	93

INGOT PRODUCTION‡

	Week Ended July 28	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	129.4†	126.4	133.8	26.1
NET TONS (In thousands)	2,079†	2,030	2,150	419

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 65 Technical Outlook—p. 111

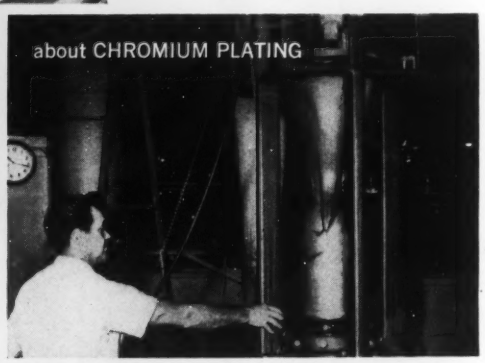


from: Metal & Thermit to: The IDEA Minded

How to make ordinary metals last longer

These large metal rings, being sprayed with a sheet-like coating of Unichrome Plastisol, will have extraordinary protection not only against corrosion but also *abrasion*. Past reports show that life of equipment subject to abrasion has been increased as much as twelve times with plastisol protection.

Unichrome Plastisols produce heavy-duty, thick, impact-absorbing, chemical resistant coatings. They make ordinary metals fit for severe service conditions. Suggested applications: As a "cushioning" coating for conveyors; also tank linings which cost less and prove better than sheet materials.



High speed plating for high speed engines

One producer plates combustion chambers of rocket engines with chromium to gain its high melting point and corrosion resistance. The Unichrome SRHS® Chromium Plating Bath which was installed reduced plating time by 6 hours per engine. Furthermore, the leveling action of the bath smooths out the small imperfections in the surface being plated, producing a finer finish. Note: The SRHS Bath is also self regulating, giving more *foolproof* operation.

Well welded . . . world's largest coal trailer

Built by Marion Metal Products Co. to carry 95 cubic yards of coal, the largest bottom-dump hopper trailer weighs more than 119 tons. This specially engineered trailer was welded with Metal & Thermit "Murex" electrodes. These electrodes again demonstrated that they develop welds with good impact qualities, handle easily, deposit fast at high currents for economy in fabrication.

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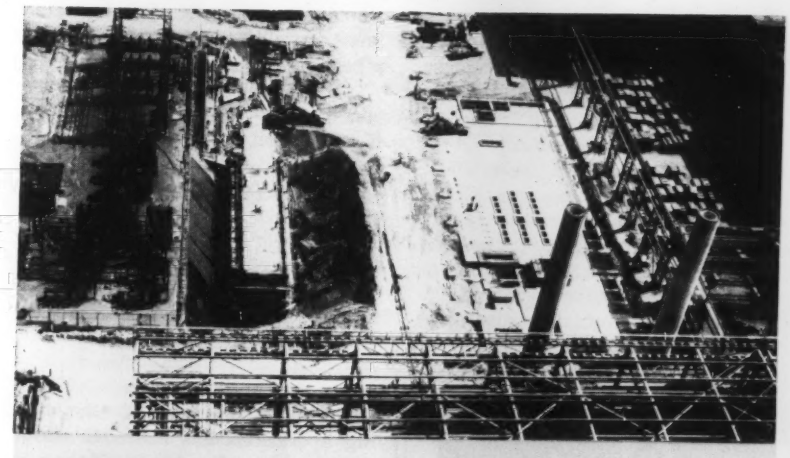
ORGANIC COATINGS
TIN & TIN CHEMICALS
CERAMIC MATERIALS
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP

METAL & THERMIT
CORPORATION
GENERAL OFFICES: RAHWAY, NEW JERSEY
Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit—United Chromium of Canada, Limited, Rexdale, Ont.



Kaiser Steel Expands To Meet Future

1. **Iron ore facilities—40 per cent greater production.**
2. **Coal properties—modernization and new facilities.**
3. **Coke ovens—90 new ones, bringing total to 315.**
4. **Blast furnace—capacity raised from 1,314,000 tons to 2,121,000 tons with addition of Furnace No. 4 and relining of Nos. 1, 2 and 3.**
5. **Steelmaking—capacity raised from 1,536,000 tons to 2,976,000 tons with addition of three oxygen steelmaking furnaces.**
6. **Soaking pits—ten new ones; enlarging 22 others.**
7. **Slabbing mill—new 46 in. x 90 in. universal mill.**
8. **Plate mill—conversion from 110 in. to 148 in.**
9. **Hot strip mill—integrate new 5-stand Mesta roughing mill with present 86 in. strip mill and relocate in new building.**
10. **Tin plate—increase capacity from 200,000 to 370,000 tons with new electrolytic tinning and continuous annealing lines.**
11. **Sinter plant—erection of second plant.**
12. **Line pipe—increase maximum diameter from 30 to 42 in. through $495,000 expansion at Napa, Calif.**
13. **Cold-rolled strip—new temper mill.**

More Steel for West Coast

KAISER STEEL Corp. is betting on the future of the West Coast with big stakes. Company officials are convinced that their $194 million wager (see table above) will pay off with good odds.

By 1965, the seven far western states (California, Oregon, Washington, Arizona, Utah, Nevada and Idaho) will be consuming 10 million tons of steel, predicts Edgar F. Kaiser, vice president. Consumption last year was about 6.5 million tons. Fred Borden, vice president of sales, points out that the company's main market area, California, has about 13.5 million people. By 1960, he expects its population to be 18.5 million. Per capita consumption in the West is only about 650 lb, compared with a national figure of 946. Mr. Borden is confident that as industry matures in the area, per capita consumption will catch up with the national figure. So the growth pattern could outstrip that of the rest of the nation generally.

Meeting Challenge — By mid-1958, Kaiser Steel will be in a better position to cash in on this growing market. Its new blast furnace No. 4 will be tapped about Mar. 1, increasing pig iron capacity by nearly 800,000 tons a year. It will have a 28-ft hearth lined out to 29 ft 6 in. with carbon refractory to the top of the bosh. The addition of three oxygen steelmaking furnaces (scheduled for completion by Dec. 31 this year) will increase ingot capacity to 2,976,000 net tons annually, almost double present capacity. Finished steel capacity will rise to 2,050,000 tons by next April.

This could make Kaiser the largest steel producer west of the Mississippi river, company officials claim. (Ingot capacities for other leading producers as of Jan. 1, 1957, were: Columbia-Geneva Steel Division, U.S. Steel Corp., 2,679,000 tons; Colorado Fuel & Iron Corp., 2 594,500 tons; Bethlehem Pacific Coast Steel Corp., 1 million tons.)

Raw Materials—The company is independent as far as raw materials are concerned. Its ore properties at Eagle Mountain, only 164 miles from the steel plant at Fontana, Calif., contain enough high grade ore to last another 50 years at the projected rate of consumption. Containing about 51 per cent iron as mined, the ore is beneficiated to about 60 per cent before shipment to the blast furnaces. New facilities and modernization of equipment will increase production by about 40 per cent to keep up with the requirements of the expansion program.

At the company's Sunnyside, Utah, coal mines, there are adequate reserves to last Fontana 80 to 110 years. To insure adequate supplies for the long term, Kaiser bought a 530,000 acre coal property in Raton, N. Mex., in 1955. Both properties are undergoing further development and modernization as part of the expansion program. In 1955, Kaiser bought a large deposit of high grade limestone near Cushenbury, Calif., just 75 miles from Fontana.

Room To Grow—Western mills are supplying only a little over half

the finished steel required by the western market. About 40 per cent comes from eastern producers. Kaiser is convinced that with its low cost of raw materials and its closeness to the market (California accounted for 42 per cent of western steel receipts in 1955), it will have no problem selling its increased output.

The expansion of finished steel facilities is aimed primarily at three of the best markets on the coast. Conversion of the 110-in. plate mill to 148 in. will increase plate capacity by about 150 per cent. The West Coast has never had enough heavy plate and shape capacity to fill its requirements. Original plans called for only a 144-in. mill, which would have made it possible for the company's Napa, Calif., pipe mill to produce 40-in. line pipe. But when it became known that Middle Eastern oil interests were planning to install 42-in. lines, Kaiser officials revamped their plans. In the past, Napa, which gets its steel from Fontana, has been able to make up to 30-in. pipe.

About one-fourth of the nation's consumption of steel for tin cans is concentrated on the West Coast. But Kaiser and Columbia-Geneva supply only 40 per cent of that area's tin plate requirements. Kaiser feels it is safe in practically doubling its tin plate capacity from 200,000 tons to 370,000 tons a year.

Current Situation—Kaiser's optimism is bolstered by the current order and production rates. While the national average of steelmaking operations has fallen to about 80 per cent of capacity, Kaiser is averaging 100 per cent or better. Sales officials report the company is booked through the third quarter on most standard steel products and through the end of the year on tin plate. Lead times are shorter than they were a year ago, but there is no lack of business.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 176 & 177

August sheet bookings will run heavier than July's but not to the extent producers had anticipated. Mills still have open capacity available for next month, and there is no certainty that it will be taken up.

Producers are encouraged by the livelier interest being shown by consumers in September tonnage. Also, a spurt in demand for electrical sheets, especially the high silicon grades, is providing a bright spot in the market.

New England consumers are specifying heavier shipments in September than in August. Tonnage released by district buyers next month will not be more than 20 per cent over the low July volume. Buying over the next couple of months will be geared closely to estimated requirements, since there is no indication a rebuilding of inventories on a large scale is planned. Flat-rolled inventories are lower than they were in the first half of the year, but in more instances stocks of finished durable goods are larger.

Automotive industry activity at present is limited to scattered purchases of cold-rolled sheets for 1957 model cars, the production of which is continuing longer than

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COST REDUCTIONS
IN YOUR
STAMPING OPERATIONS!

PIVOT PUNCHES
WILL reduce your
cost by at least
50%

● In plant after plant (more than 1400 plants) Pivot Punches are out-performing ordinary perforating punches by at least 2-1. Furthermore, where 50 replacement punches were formerly required for a particular production job, the same quantity runs, are now achieved with less than 25 Pivot Punches.

The reason? Straight-grinding, high speed steel, whipsleeving . . . concentricity . . . In all, there are 9 reasons why Pivot Punch performance **overcomes** the causes of punch failures — and overcomes costs.

Pivot **guarantees** 50% reduction in downtime. You'll save an **additional** 30% in die maintenance time, too. Yes, the percentages are with you, with Pivot Punches.

WANT PROOF? A Pivot Service Engineer will show you how some of the largest manufacturers in the country have increased production, accuracy, and profits and reduced costs by standardizing on Pivot Punches. Just write or phone for a date at your convenience.

COMPLETE SERVICE ON ALL TYPES OF PUNCHES. WRITE FOR CATALOG DEPT. S.

Tondra-treated FOR EXTREME HARDNESS

PIVOT PUNCH and DIE CORPORATION
NORTH TONAWANDA, NEW YORK

had been anticipated. Since the auto builders have cut their steel inventories to a rumored 20-day supply, they have had to continue ordering sheets to meet production requirements.

Scattered signs of an increase in ordering of sheets for the 1958 model cars are noted, but orders are said to be limited to a few tonnages for August shipment. What will be required in September still is unknown, but the steel mills are banking on a surge in auto needs that month.

Appliance requirements for sheets continue small, and expectations are that demand from that consuming area will pick up more slowly than automotive buying. Cool weather in June brought some cancellations or postponements of deliveries from the air-conditioning industry. The latest heat wave has not stimulated demand to any extent. But requirements of stovemakers are reported rising noticeably.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 175

The cement strike is affecting some building operations. Shipments of structural steel and reinforcing bars have been postponed in a number of instances. But the situation has not discouraged new buying to any extent, though it will if construction operations are interrupted for long.

Mill order books are fairly heavily loaded with tonnage. New releases are not coming through as expected. Backlogs are building up at some producing plants.

Steel Bars . . .

Bar Prices, Page 175

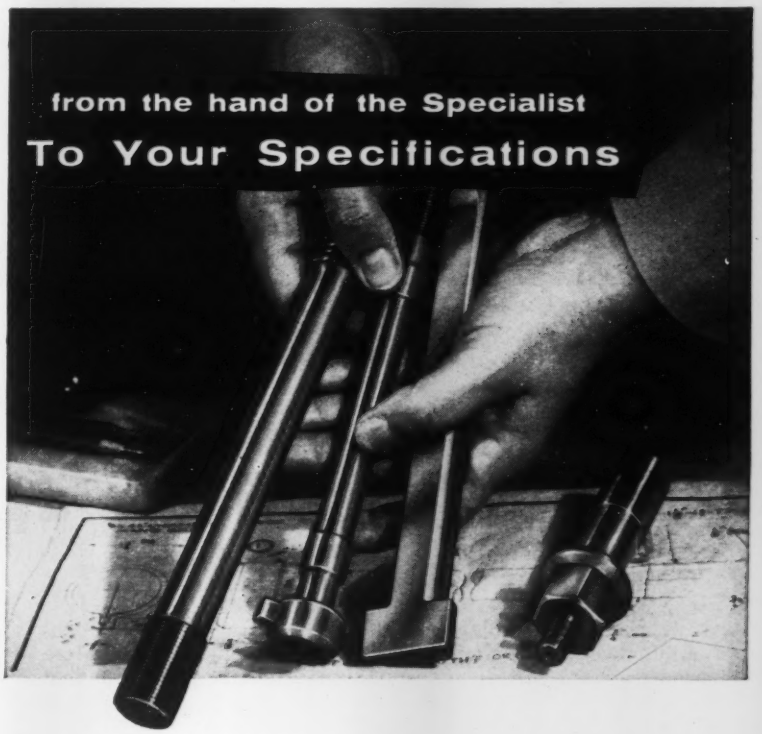
Although the increase in August bookings will not be as much as had been expected, the trend in hot carbon bar demand is upward. Some producers think that September will be their best month since May. By that time, the vacation season will be over and buying generally should be stimulated by heavier demand from the automotive and related industries. Both factors also will have a bearing on requirements for cold-finished carbon bars, and hot and cold alloy bars, all of which are moving slowly.

Prompt shipments will be possible through August at most market centers. Capacity is open for next month in most bar categories, hot-rolled leaded stock being an exception in New England.

Leading customers of cold-finished bar producers in the Pittsburgh area continue to order sparingly. The outlook for business from the automotive industry is brighter; several auto builders are beginning to show interest in their 1958 model requirements. Their orders are not expected to show up in volume until late August or early September.

St. Louis mills are operating at about 80 per cent of capacity, with demand for reinforcing bars being particularly strong. Merchant bar volume in the area is only fair, but expectations are that July tonnage will equal that in June.

One Buffalo district producer is operating at only 50 per cent of capacity. Two other area mills are operating at a much higher



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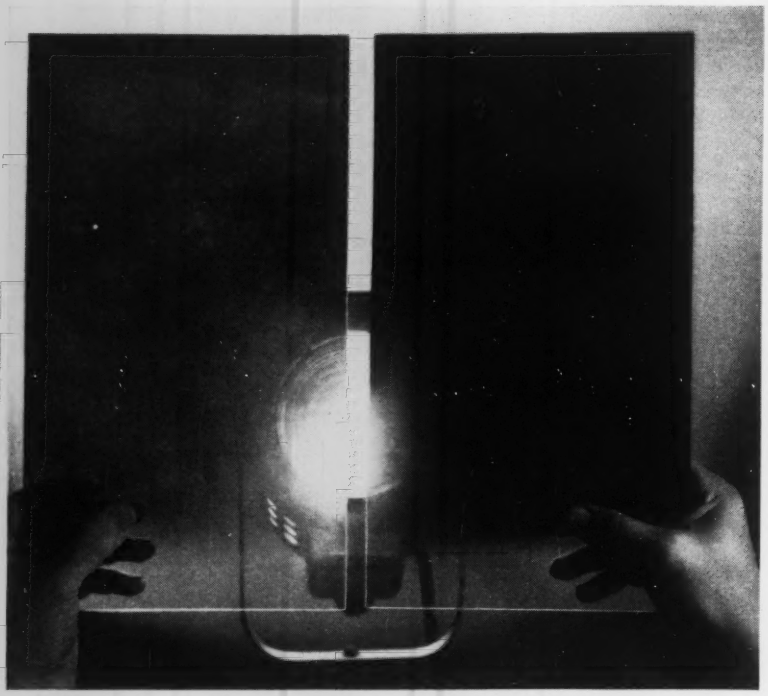


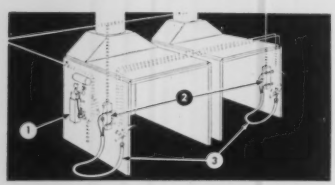
***Paint applied** to its maximum film thickness by the usual spray method (cold) looks like this in front of a spotlight. Note coverage.*

***Same paint** applied by the DeVilbiss Hot-Spray method provides much heavier coverage, as is shown on the glass panel on the right.*

Demonstration on glass proves DeVilbiss Hot Spray cuts finishing costs

Now, using a DeVilbiss Paint Heater, *one* coat sprayed hot generally covers better than *two or more* cold-sprayed coats! More paint reaches a surface *and stays there*. Thinning paint with heat permits applications of higher solid-content material for heavier coats and greatly reduces overspray.

This superior finishing method saves up to 50% in material and labor costs; may be used on all types of products—from autos, furniture, and appliances to military tanks. For facts on how much the DeVilbiss Paint Heater can save *you*, call your DeVilbiss supplier! *The DeVilbiss Company, Toledo 1, Ohio.*



DeVilbiss Hot-Spray system is foolproof; adapts to multiple gun hook-ups. Hot water from master heater (1) heats paint in exchanger (2); heat-jacketed hose assemblies (3) keep paint hot right up to the guns, assuring uniform viscosity at all times at each gun.

FOR BETTER SERVICE, BUY

DEVILBISS

DEVILBISS HELPS YOU GET THE MOST FROM THE SPRAY METHOD

rate. Bar producers on the West Coast report their July bookings are better than they had expected.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 178

Pittsburgh Screw & Bolt Corp., Pittsburgh, has completed negotiations for a merger with Southington Hardware Mfg. Co., Southington, Conn. Company officials say chief advantage of the merger will be to diversify output. The Southington company manufactures wood screws, sheet metal screws, machine screws and other special items.

Demand for industrial fasteners continues to lag seasonally. Plant suspensions for vacations figure prominently in the market this month. Expectations are business will pick up noticeably in August.

Plates . . .

Plate Prices, Page 175

While universal and strip plates can still be obtained for shipment this quarter, sheared plates are hard to obtain except at premium prices. Some producers of sheared plates are running behind on delivery promises, partly because of operating difficulties.

Even strip plates are in somewhat tighter supply than they were a few weeks ago. Reason: Some producers are moving slowly in accepting new tonnage orders for September shipment because they anticipate increased demand for sheets by that time.

Supplies of light plates exceed demand at Pittsburgh, and area consumers are receiving numerous offerings of extra tonnage. The district's continuous mills probably will continue rolling plates at least through the first couple weeks of August, when auto sheet requirements are expected to be coming out in volume.

Demand for wide and heavy plates is holding up well in New England. Most sellers are offering narrow, light gage plates in the area, equalizing on freight into the district from producing mills. Tank shops are benefiting, but they are not buying too heavily because some widths are too narrow to avoid additional welding costs. Shipyard specifications are heavier.

The Claymont Steel Products Department, Colorado Fuel & Iron Corp., at Claymont, Del., is resuming production on its 160-in. mill after a month's suspension for repairs.

Lukens Steel Co., Coatesville, Pa., broke ground on July 25 for its $33-million expansion program, scheduled for completion in 1959. New work includes electric furnace facilities which will expand ingot capacity from 750,000 to 925,000 tons annually, and a 140-in. roughing mill, which will increase rolling capacity of the company's combined mills about 40 per cent.

Tubular Goods . . .

Tubular Goods Prices, Page 179

Sales of most tubular goods are disappointing so far this quarter. A merchant pipemaker at Pittsburgh says the rate of incoming orders is normal for the summer, but individual orders appear to be smaller than usual. In a few cases, though, users seem to have held out of the market too long before replenishing inventories. They are being forced to order for relatively prompt shipment.

Auto builders have not placed many orders for mechanical tubing for 1958 models. Their orders should swell noticeably next month.

Oil country tubemakers say that bad weather in the Southwest has reduced the number of rigs operating in the oil fields. But they are still receiving sufficient orders to support capacity operations. Export business is strong. Pipe mill schedules in the St. Louis area are reported full for July and are filling for August.

Wire . . .

Wire Prices, Pages 177 & 178

Wire rod production at eastern mills is at about the same level as prevailed prior to vacation curtailments, roughly about 25 per cent under the over-all industry average. Finishing operations and consumption are in line, and only a spotty pickup in August specifications is reported.

Some wire reinforcement business is held up by the cement shortage that is resulting from a strike in that industry.

Operations are improved at the

CROSS-BAY® CAR

GASOLINE-HYDRAULIC

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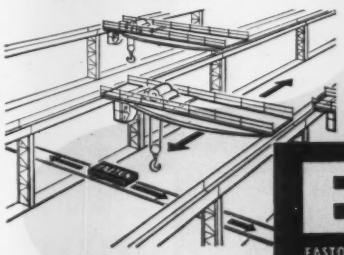
CUSTOM BUILT TRADE MARK



CUSTOM-BUILT in capacities from 5 to 500 tons. Supplements overhead crane work in multiple-bay plants. Also for low-cost, heavy-duty service between buildings, storage and shipping areas.

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A-1080

Coming in

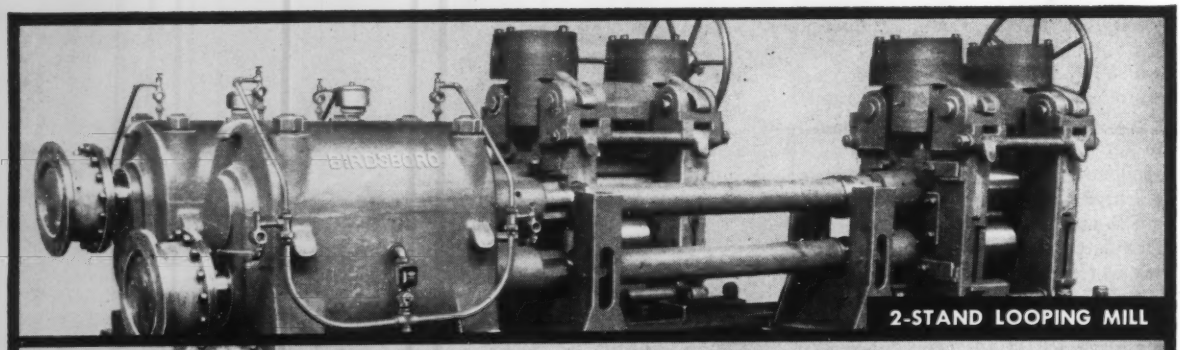
STEEL

Aug. 12

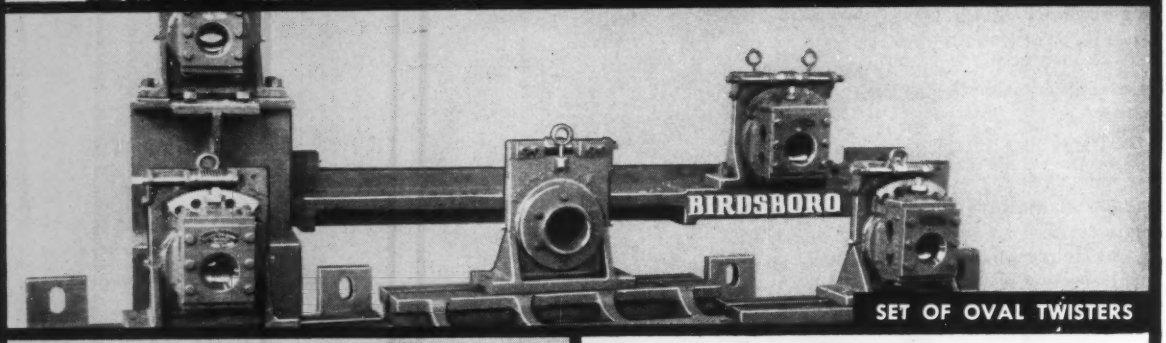
PRODUCING FOR THE NEW TECHNOLOGY

No. 7 in STEEL's
1957 Program for Management

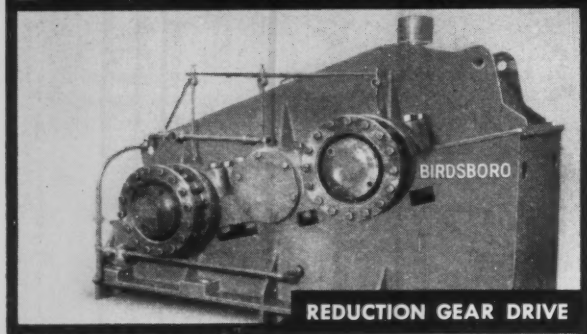
- Here's an article that can chart your future growth.
- It points up the many opportunities offered by such new fields as atomics, missiles, new materials, miniaturization . . .
- It points up new products that will be needed and how you can produce them at a profit.



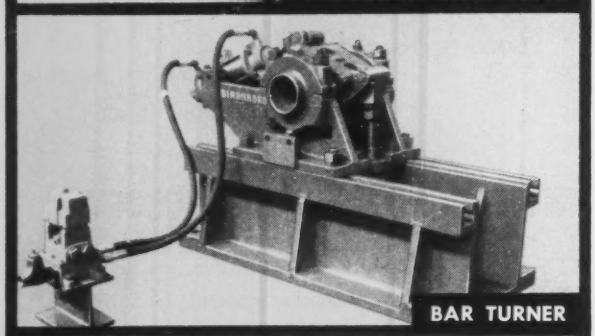
2-STAND LOOPING MILL



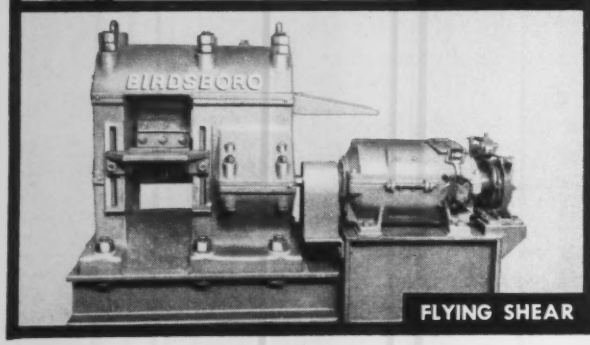
SET OF OVAL TWISTERS



REDUCTION GEAR DRIVE



BAR TURNER



FLYING SHEAR

BIRDSBORO face-lifts rod mill with new additions to increase production quotas

This equipment was supplied by Birdsboro to revamp and modernize a specialty rod mill. By custom-designing special equipment, Birdsboro was able to help the client make important advances in productivity. There is almost no limit to the design versatility of the Birdsboro staff, even for the intricate requirements of a re-building program. From a single time and labor-saving unit to an entire mill, Birdsboro has more to offer your operation . . . call in a Birdsboro representative and find out why. Main office and plant: Birdsboro, Pa.

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MM59-57

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Wickwire Spencer mills in the Buffalo area, reflecting an increase in demand for certain types of wire products. Some new buying is reported on the part of automotive and related consumers.

Although its July shipments are under those in June, the St. Louis area mill is operating at capacity. Considerable price-hedge ordering for June shipment explains the smaller July movement to some extent. Sellers anticipate strong automotive demand this fall.

Structural Shapes . . .

Structural Shape Prices, Page 175

Despite the effects of the cement strike on building and road construction, structural shape supply continues fairly stringent. This is particularly true of wide flange sections.

Generally, shape mills are well booked up over the remainder of this quarter. Expectations are they will be fully occupied well into the future since fabricators' order backlogs still are substantial, though new work is not keeping pace with contract completions.

A strike for higher wages (25 cents more per hour) halted production at 19 structural fabricating shops in New England last week.

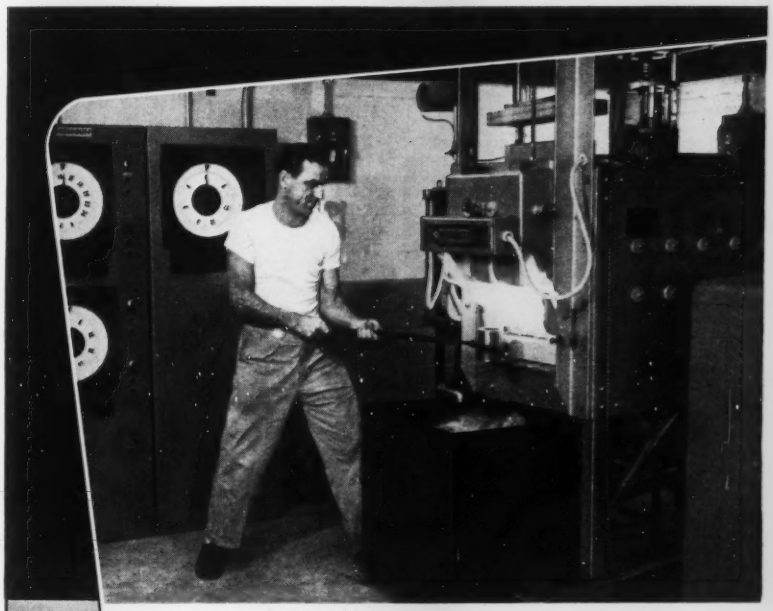
The cement strike has caused some fabricated steel deliveries to be set back. Less bridge tonnage is being estimated in the Northeast area, but school work holds at a high level, stimulating active demand for light shapes and junior beams. Some increase in bridge inquiry is due in October for mid-1958 delivery.

Warehouse . . .

Warehouse Prices, Page 180

The impact of vacation suspensions on warehouse steel demand has been more severe than expected. On tonnage and dollar volume bases, July will be the slowest month so far this year at most distributing centers.

A leading warehouse operator at Pittsburgh complains that vacations this month cut demands for sheets, bars and pipe by almost 50 per cent. Vacations have ended at many district plants, but resumption of operations has not



Faster solution-heat-treating with a Hevi-Duty

CONVECTION BOX FURNACE

The Beryllium Corporation uses this Hevi-Duty Multi-Range Convection Box Furnace in their process control laboratory for solution-heat-treating "Berylco", Beryllium Copper alloys. The laboratory director reports outstanding results and economy due to the following advantages:

1. Rapid heating to solution temperatures (1450 or 1700°F depending on the alloy being treated) is made possible by a motor driven fan that circulates the hot gases through the densest of loads, and by,
2. Direct, even heat radiation to all surfaces of the load by Hevi-Duty Return Bend heating elements on all six sides of the furnace chamber.
3. Control of temperature within ±5°, throughout the chamber.
4. Elimination of oxidation by use of a protective atmosphere.
5. Freedom of both hands for rapid charging, discharging and quenching by a foot treadle operated door.

For further information about Hevi-Duty Convection furnaces, write for Bulletin 341R.

HEVI-DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Heat Treating Furnaces... Electric Exclusively

Dry Type Transformers *Constant Current Regulators*

Finished Steel Shipments—May, 1957

(All grades, net tons)

Products	Carbon	Alloy	Stainless	First Five Months 1957	First Five Months 1956
Ingots & castings	31,783	18,138	2,211	223,744	348,305
Blooms, slabs, etc.	214,788	36,973	1,299	1,154,152	1,103,322
Tube rounds	6,326	274	3	39,732	3,019
Skelp	9,202	.....	.....	78,785	81,776
Wire rods	79,819	1,446	462	436,728	520,165
Structural shapes	607,555	5,479	9	2,864,659	2,325,756
Steel piling	46,425	.....	.....	248,614	172,448
Plates	855,221	58,613	4,031	4,214,947	3,405,983
Rails (standard)	136,846	.....	.....	620,398	571,403
Rails (all other)	6,883	.....	.....	40,296	47,438
Joint bars	9,589	.....	.....	42,673	43,041
Tie plates	25,685	.....	.....	138,589	156,224
Track spikes	9,591	.....	.....	38,188	51,771
Wheels	33,144	74	.....	164,255	153,585
Axles	19,752	34	.....	91,541	77,464
Bars (hot rolled)	549,025	138,252	4,650	3,655,113	4,156,919
Bars (reinforcing)	187,952	.....	.....	1,101,554	1,032,093
Bars (cold drawn)	91,971	17,060	5,428	631,282	865,312
Tool steel	1,234	8,974	.....	48,058	57,546
Standard pipe	240,300	72	.....	1,237,238	1,324,331
Oil country goods	239,042	38,469	.....	1,343,819	1,201,942
Line pipe	392,219	.....	.....	1,809,585	1,532,226
Mechanical tubing	50,004	19,123	403	378,413	453,837
Pressure tubing	30,286	7,989	2,271	200,702	160,048
Wire—drawn	241,762	4,145	2,556	1,168,218	1,414,988
Nails & staples	43,077	.....	.....	201,445	259,611
Barbed wire	7,003	.....	.....	34,425	45,128
Woven fence	22,426	.....	.....	117,553	150,082
Bale ties	6,253	.....	.....	22,727	26,187
Black plate	36,807	.....	.....	320,458	383,563
Tin plate (HD)	34,292	.....	.....	429,136	481,005
Tin plate (electro)	278,769	.....	.....	2,461,696	2,313,764
Sheets (hot rolled)	630,205	23,076	2,395	3,665,612	4,088,894
Sheets (cold rolled)	877,062	4,258	13,461	5,143,062	6,366,721
Sheets (galvanized)	206,657	.....	.....	1,052,990	1,373,123
Sheets (other coated)	16,243	.....	.....	87,364	113,984
Elec. sheets & strip	8,691	49,372	.....	300,403	375,379
Strip (hot rolled)	115,807	2,841	342	662,426	852,035
Strip (cold rolled)	82,593	1,899	13,720	530,908	765,563
Total (1957)	6,482,289	436,561	53,241	37,001,488	.....
Total (1956)	7,182,815	521,059	60,902	.....	38,855,981

Imported Steel

Prices per 100 lbs. (except where otherwise noted) landed, including customs duty, but no other taxes.

	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (⅜" Dia. incl. all extras)	$6.78	$7.01	$6.76	$6.44
Merchant Bars (¼" Round incl. all extras)	7.62	7.85	7.48	7.22
Bands (1"x¼"x20' incl. all extras)	7.76	7.98	7.65	7.38
Angles (2"x2"x¼" incl. all extras)	6.57	6.75	6.99	6.69
Beams & Channels (base)	6.82	7.00	7.24	6.94
Furring Channels (C.R. ¾", per 1000')	26.62	27.77	....	....
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's, bright, low C, (11½ ga.)	7.38	7.52	8.52	8.52
Wire, galvanized, low C, (11½ ga.)	8.01	8.15	9.42	9.42
Wire, Merchant quality, bl. ann., (10 ga.)	7.60	7.75	8.78	8.78
Rope Wire (.045", 247,000 PSI, incl. extras)	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14G, 97 lbs. net)	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C, per 100')	8.48	8.83	....	....
Casing (5½", 15.5 J55, T & C, per 100')	194.00	199.00	....	....
Tubing (2⅞", 6.4 J55, EUE, per 100')	103.00	104.00	....	....
Forged R. Turn. Bars, C-1035 (from 10" di.)	14.00	14.23	14.00	13.74

Ask prices on: Bulb tees, bolts and nuts, manganese steel plates and shapes, welded wire reinforcing mesh and hardware cloth, boiler tubes, A-335-P11 pressure pipe.

from prominent century-old West German Mills

Through Stahlunion-Export GmbH

BOCHUMER VEREIN World's first Steel Foundry, 1842—Vacuum degassed Forgings. Pinion wire and spring wire for watches and clocks.

DORTMUNDER UNION Originators of Interlock Sheet Piling—Larssen Sheet Piling, Plate, Shapes, Forged Bars and Shafts.

NIEDERRHEIN Europe's most modern Rod Mill—OH, CH, Low Metalloid, Specialty Wire Rod, Merchant Bars.

WESTFAELISCHE UNION Europe's largest Wire Mill—All types drawn Wire and Wire Products—Nails, Barbwire, Wire Rope, Prestress Concrete Wire and Strand.

PHOENIX RHEINROHR Europe's largest Pipe Mill—Pipe, Tubing, Flanges, Welding Fittings, Precision Tubes, Tubular Masts.

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No red tape! We deliver to any place in North America. Over 10 years of service to more than 2000 North American accounts—as a domestic firm, on domestic terms—with lower costs or better deliveries. Write for "How to be at home with products made abroad" and the address of your local KOC representative.

KURT ORBAN COMPANY, INC., 46 Exchange Place, Jersey City 2, N. J.

In Canada: Kurt Orban Canada, Ltd., Vancouver, Toronto, Montreal

given rise to heavier demands for steel at the district warehouses.

There is no sign of a gain in sales to appliance makers or the auto builders. Industrial construction continues to provide a bright spot in the sales picture with plates and structurals in heavy demand. Distributors have succeeded in building up stocks of standard structurals and light plates, but they are still short of wide flange beams and heavy plates.

Iron Ore . . .

Iron Ore Prices, Page 181

Shipments of Lake Superior iron ore in the seven day period ended July 22 totaled 3,126,505 gross tons, reports the American Iron Ore Association. This compares with only 264,031 tons in the like period a year ago when the Great Lakes ore fleet was tied up by a strike.

Cumulative shipments in the 1957 navigation season through July 22 totaled 40,100,540 gross tons, up 6,645,674 from the 33,454,866 tons moved in the like period of the 1956 season.

Pig Iron . . .

Pig Iron Prices, Page 180

Blast furnace production (pig iron, ferromanganese and spiegeleisen) in June totaled 6,659,592 net tons. Output for the first six months of the year is 41,658,851 tons (41,263,657 pig iron; 395,194 ferralloys), reports the American Iron & Steel Institute.

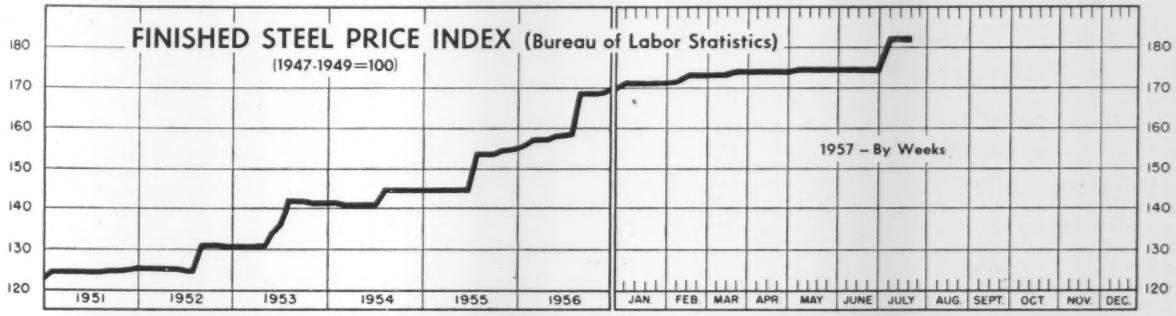
June production by districts was: Eastern, 1,461,652 tons; Pittsburgh-Youngstown, 2,170,313; Cleveland-Detroit, 818,667; Chicago, 1,337,423; Southern, 555,610; Western, 315,927.

Pig iron shipments are off sharply this month because of foundry vacations. Indications are they will snap back when the shops resume production.

All merchant iron sellers in the North have advanced their prices $1.50 a ton. In the South prices went up $3.50 a ton. The differential between the two areas that prevailed prior to last March now is restored.

The increase in prices did not have much effect on demand. Few consumers had been buying as a hedge against the increase.

Price Indexes and Composites



July 23, 1957	Week Ago	Month Ago	June Avg.	Year Ago
181.3	181.3	174.3	174.3	158.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 23

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.600
Rails, Light, 40 lb	7.067
Tie Plates	6.600
Axles, Railway	9.825
Wheels, Freight Car, 33 in. (per wheel)	60.00
Plates, Carbon	6.150
Structural Shapes	5.942
Bars, Tool Steel, Carbon (lb)	0.480
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769
Bars, H.R., Alloy	10.525
Bars, H.R., Stainless, 303 (lb)	0.525
Bars, H.R., Carbon	6.425
Bars, Reinforcing	6.210
Bars, C.F., Carbon	10.360
Bars, C.F., Alloy	13.875
Bars, C.F., Stainless, 302 (lb)	0.553
Sheets, H.R., Carbon	6.192
Sheets, C.R., Carbon	7.089
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.688
Sheets, Electrical	12.108
Strip, C.R., Carbon	*9.193*
Strip, C.R., Stainless, 430 (lb)	0.493
Strip, H.R., Carbon	6.245
Pipe, Black, Buttweld (100 ft)	19.814
Pipe, Galv., Buttweld (100 ft)	23.264
Pipe, Line (100 ft)	*199.023*
Casing, Oil Well, Carbon (100 ft)	194.499
Casing, Oil Well, Alloy (100 ft)	304.610
Tubes, Boiler (100 ft)	*48.213*
Tubing, Mechanical, Carbon (100 ft)	24.470
Tubing, Mechanical, Stainless, 304 (100 ft)	199.735
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
Black Plate, Canmaking Quality (95 lb base box)	7.583
Wire, Drawn, Carbon	10.225
Wire, Drawn, Stainless, 430 (lb)	0.655
Bale Ties (bundle)	7.967
Nails, Wire, 8d Common	9.828
Wire, Barbed (80-rod spool)	8.719
Woven Wire Fence (20-rod roll)	*21.737*

STEEL's FINISHED STEEL PRICE INDEX*

	July 24 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	228.59	210.45	171.92
Index in cents per lb	6.479	6.479	6.193	5.701	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$146.19	$146.19	$140.24	$131.27	$106.32
No. 2 Fdry Pig Iron, GT	66.49	66.49†	64.70	61.09	52.54
Basic Pig Iron, GT	65.99	65.99†	64.23	60.11	52.16
Malleable Pig Iron, GT	67.27	67.27†	65.77	61.63	53.27
Steelmaking Scrap, GT	54.00	54.33	55.83	47.50	42.67

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical pric ecomposite, STEEL, Sept. 1, 1952, p. 130. †Revised

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	July 24 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.075	4.65	3.70
Bars, H.R., Chicago	5.425	5.425	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.715	5.715	5.365	4.93	4.252
Bars, C.F., Pittsburgh	7.30*	7.30*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.275	5.275	5.00	4.60	3.65
Shapes, Std., Chicago	5.275	5.275	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.585	5.585	5.31	5.00	3.93
Plates, Pittsburgh	5.10	5.10	4.85	4.50	3.70
Plates, Chicago	5.10	5.10	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.50	5.50	5.25	4.80	4.15
Plates, Sparrows Point, Md.	5.10	5.10	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.15
Sheets, H.R., Pittsburgh	4.925	4.925	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.925	4.925	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	6.05	6.05	5.75	5.325	4.35
Sheets, C.R., Chicago	6.05	6.05	5.75	5.325	4.35
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.60	6.60	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.925	4.925	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.925	4.925	4.675	4.325	3.50
Strip, C.R., Pittsburgh	7.15	7.15	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	7.15	7.15	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	7.25	7.25	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.65	7.65	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.95	8.95	8.49	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.85	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$96.00	$96.00	$91.50	$84.50	$66.00
Wire rods, 7/32-5/16" Pitts.	6.15	6.15	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton

	July 24 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$65.50	$62.25	$53.00
Basic, Valley	67.00	64.50	64.50	60.00	52.00
Basic, deld., Phila.	69.88	69.88	68.38	66.26	56.75
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	65.00	63.00	52.50
No. 2 Fdry, Chicago	66.50	66.50	65.00	61.75	52.50
No. 2 Fdry, deld., Phila.	70.38	70.38	68.88	66.76	57.25
No. 2 Fdry, Birm.	62.50	62.50	59.00	57.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	66.70	62.70	56.43
Malleable, Valley	66.50	65.00	65.00	60.50	52.50
Malleable, Chicago	66.50	66.50	65.00	61.75	52.50
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	215.00†	188.00*

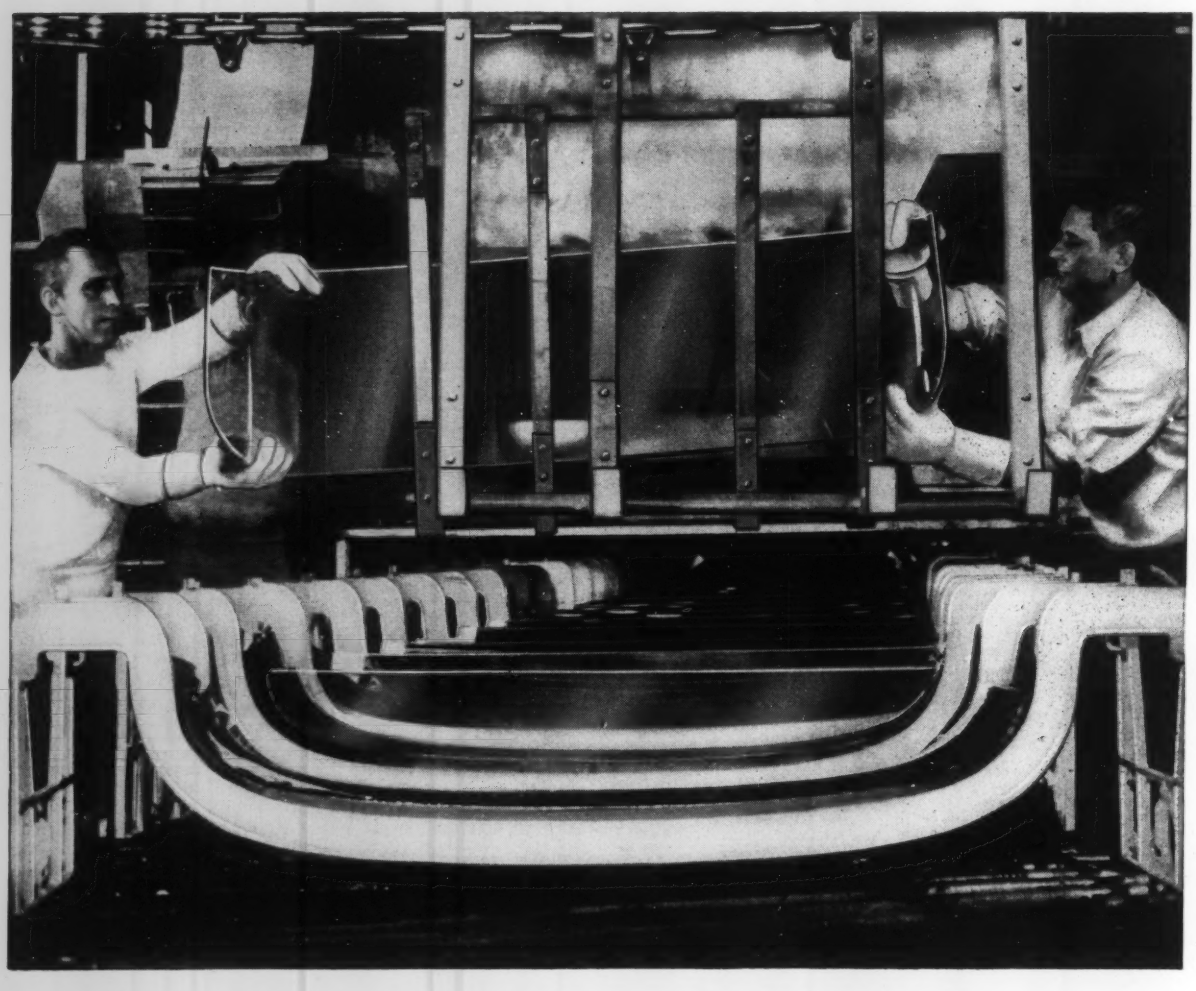
†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

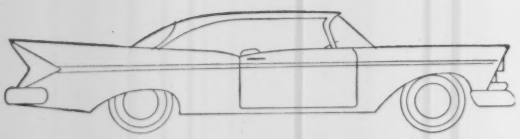
No. 1 Heavy Melt, Pittsburgh	$55.50	$55.50	$57.50	$46.50	$44.00
No. 1 Heavy Melt, E. Pa.	53.50	54.50	56.50	50.00	41.50
No. 1 Heavy Melt, Chicago	53.00	53.00	53.50	46.00	42.50
No. 1 Heavy Melt, Valley	54.50	54.50	54.50	49.50	44.00
No. 1 Heavy Melt, Cleve.	51.50	51.50	51.50	55.50	43.00
No. 1 Heavy Melt, Buffalo	46.50	46.50	46.50	44.50	37.00
Rails, Rerolling, Chicago	79.50	76.50	74.50	68.50	52.50
No. 1 Cast, Chicago	47.50	47.50	47.50	45.50	45.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.00	16.50	17.50



Greater visibility, trimmer lines in new car styling... thanks to GAS



With nearly 7,000,000 cars being produced annually, the increased use of glass has demanded major production improvements in the manufacture of new panoramic windshields and back-lights.

Since the forming of the intricately curved glass is done at a temperature at which glass is soft and can be bent, the production process challenged heat process engineers to design new automatic equipment capable of mass producing these large precision glass pieces.

Selas engineers, working with the nation's leading glass manufacturer, discovered that Gas could produce the proper time-temperature cycle demanded by this process, efficiently, quickly, reliably. The flat glass is conveyed under radiant Gas burners which bring the glass quickly up to bending temperature and allow the shaping of windshields, with reproducible uniformity, at high production rates.

The production of this wrap-around windshield is another example of the contributions modern Gas equipment is making to American manufacturing. If you have an operation demanding precise process heating, call your local Gas Company's Industrial Specialist and discuss the economies and results you, too, can get with modern Gas equipment. *American Gas Association.*

See Playhouse 90 with Julia Meade on CBS-TV. Watch local listings for time and station. Sponsored by your Gas Company and the Gas Industry.

Steel Prices

Mill prices as reported to STEEL, July 24, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 176; to footnotes, page 178.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell,Pa. S3 .....77.00
Lowellville,O. S3 .....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Bridgeport,Conn. N19 ..80.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B2 ....77.50
Lackawanna,N.Y. B2 ..77.50
Munhall,Pa. U5 .....77.50
S.Chicago,Ill. R2, U5 ..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Bridgeport,Conn. N19..101.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3 101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 ....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2,U5,W14 96.00
S.Duquesne,Pa. U5 ....96.00
S.SanFrancisco B3 ....105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$114.00
Bridgeport,Conn. N19.114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 121.00
Detroit S41 .....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ...135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor,Ind. Y1 ..114.00
Johnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2 114.00
LosAngeles B3 .....134.00
Lowellville,O. S3 ....114.00
Massillon,O. R2 .....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2,U5,W14 114.00
S.Duquesne,Pa. U5 ..114.00
Struthers,O. Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19..$122.50
Buffalo R2 .....117.50
Canton,O. R2 .....120.00
Cleveland,O. R2 .....117.50
Gary,Ind. U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ..117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 .....5.075
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 .....4.875
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....5.80
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 ....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P17 .....6.15
N.Tonawanda,N.Y. B11 . 6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 .....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill.(1) N15 ....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ....5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 .....5.275
Bessemer,Ala. T2 .....5.275
Bethlehem,Pa. B2 ....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1 ....6.025
Gary,Ind. U5 .....5.275
Geneva,Utah C11 .....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ..5.275
Johnstown,Pa. B2 ....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2 ..5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ....5.575
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ....5.50
Portland,Oreg. O4 .....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14 5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ....5.975
Weirton,W.Va. W6 .....5.275

Wide Flange
Bethlehem,Pa. B2 ....5.325
Clairton,Pa. U5 .....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2 5.525
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ....5.50
S.Chicago,Ill. U5 .....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 ....8.50
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2 .5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 .....6.225

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky. (15) A10 5.10
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 ....5.70
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.50
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.20
Fairfield,Ala. T2 .....5.10
Fontana,Calif.(30) K1 ..5.85
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 .....5.30
Harrisburg,Pa. P4 .....5.80
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.45
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ...5.95
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale, Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown R2, U5, Y1.5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.35
Fontana,Calif. K1 .....7.50
Geneva, Utah C11 ....6.75
Johnstown,Pa. B2 .....7.00
SparrowsPoint,Md. B2 .7.00

PLATES, Wrought Iron
Economy,Pa. B14 .....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 .....7.625
Clairton,Pa. U5 .....7.625
Claymont,Del. C22 .....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3..7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1. 8.375
Gary,Ind. U5 .....7.625
Geneva,Utah C11 .....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 .....7.625
Lackawanna,N.Y. B2 ..7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2 7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, Alloy
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 .....7.20
Coatesville,Pa. L7 .....7.20
Farrell,Pa. S3 .....7.20
Fontana,Calif.(30) K1..7.95
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 .....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14 7.20
SparrowsPoint,Md. B2 .7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Harrisburg,Pa. P4 ....6.275
Ind.Harbor,Ind. I-2 ..6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa.(9) J5 ....5.425
Alton,Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ..5.425
Bridgeport,Conn.(9) N19 5.65
Buffalo(9) R2 .....5.425
Clairton,Pa.(9) U5 ....5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5 ....5.525
Emeryville,Calif. J7 ....6.175
Fairfield,Ala.(9) T2 ..5.425
Fairless,Pa.(9) U5 ....5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 .....5.425
Houston(9) S5 .....5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
N.Tonawanda,N.Y.(46)B11 5.775
Pittsburg,Calif.(9) C11 6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 ....6.175
Seattle B3, N14 .....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5 .5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.625
Sterling,Ill.(9) N15 ...5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11 6.125
Youngstown(9) R2, U5 5.425

BARS, H.R. Leaded Alloy
(Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 ....6.475
Bridgeport,Conn. N19 ..6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 .....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Ecorse,Mich. G5 .....6.575
Fairless,Pa. U5 .....6.625
Farrell,Pa. S3 .....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 ....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 .....6.475
Warren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 .....7.925
Bessemer,Ala. T2 .....7.925
Bethlehem,Pa. B2 .....7.925
Bridgeport,Conn. N19 ..7.95
Clairton,Pa. U5 .....7.925
Cleveland R2 .....7.925
Ecorse,Mich. G5 .....8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 ....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 ..7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2 .....7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ...5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet,Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.80
KansasCity,Mo. S5 .....6.80
Pittsburgh J5 .....6.55
Youngstown U5 .....6.55

BARS, C.F., Leaded Alloy
(Including leaded extra)
Ambridge,Pa. W18 ....9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 .....10.10
Chicago W18 .....9.925
Cleveland C20 .....9.475
LosAngeles P2, S30
(Gr. A) 11.30
(Gr. B) 11.80
Monaca,Pa. S17 .....9.925
Newark,N.J. W18 ....10.10
SpringCity,Pa. K3 ....10.10
Warren,O. C17 .....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 .....7.90
Bridgeport,Conn. N19 ..7.65
Buffalo B5 .....7.85
Camden,N.J. P13 .....7.75
Carnegie,Pa. C12 .....7.30
Chicago W18 .....7.30
Cleveland A7, C20 .....7.30
Detroit B5, P17 .....7.50
Detroit S41 .....7.30
Donora,Pa. A7 .....7.30
Elyria,O. W8 .....7.30
FranklinPark,Ill. N5 ..7.30
Gary,Ind. R2 .....7.30
GreenBay,Wis. F7 .....7.30
Hammond,Ind. J5, L2..7.30
Hartford,Conn. R2 .....7.80
Harvey,Ill. B5 .....7.30
LosAngeles P2, S30 ....8.75
LosAngeles R2 .....9.20
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 .....7.30
Monaca,Pa. S17 .....7.30
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 .....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 .....7.30
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 .....7.30
Willimantic,Conn. J5 ..7.80
Waukegan,Ill. A7 .....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa. M12,R2 8.775
Bethlehem,Pa. B2 .....8.775
Bridgeport,Conn. N19 ..8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ...8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 ....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 ....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2 ..8.775
Los Angeles P2, S30...10.65
Mansfield,Mass. B5 ....9.075
Massillon,O. R2, R8 ..8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago W14 .....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Worcester,Mass. A7 ...9.075
Youngstown F3, Y1 ...8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.425
Atlanta A11 .....5.625
Birmingham C15 .....5.425
Bridgeport,Conn. N19 ...5.65
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emerysville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....5.775
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 .....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2 .5.425
Sterling,Ill.(1) N15 ..5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..6.00
Torrance,Calif. C11 ....6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. ¼-1" B2 7.08
KansasCity,Mo. S5 .....7.35
Lackawanna,N.Y. B2 6.85
Marion O P11 .....6.70
Newark,N.J. U8 .....7.55
Pittsburgh J5, U8 .....7.10
Seattle B3, N14 .....7.70
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ...7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy(Staybolt)B14 .18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.325
ChicagoHts.(4)(44) I-2 5.425
ChicagoHts.(4) C2 .. 5.425
Ft.Worth,Tex.(26) T4 ..5.875
Franklin,Pa.(3) F5 ...5.325
Franklin,Pa.(4) F5 ...5.425
JerseyShore,Pa.(4) J8 ..5.10
Marion,O.(3) P11 .... 5.325
Tonawanda(3) R12 .. 5.325
Tonawanda(4) B12 ....6.00
Williamsport, Pa.(3)S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 ....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.775
Gary,Ind. U5 .....4.925
Geneva,Utah C11 ....5.025
GraniteCity,Ill.(8) G4..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 ..... 4.925
Lackawanna,N.Y. B2 4.925
Mansfield,O E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 ....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .. ....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill A1 ....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 4.925
Steubenville,O. W10 ...4.925
Warren,O. R2 .... ..4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1..4.925

SHEETS, H.R., (19 Ga.& Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ....8.10

SHEETS, H.R. (14 Ga.& Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 ....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.125
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2,Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna(35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5,W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2..7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ....7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ...6.05
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ....7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 .....6.05
SparrowsPoint,Md. B2 5.75
Steubenville,O. W10 ....6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ...10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint(38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	.....6.95	7.20
Gary,Ind. U5	.....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	...6.95	7.20
Irvin,Pa. U5	....6.95	7.20
Kokomo,Ind. C16	.7.05	...
MartinsFry. W10	.6.95	7.20
Pittsburgh J5	....6.65	...
Pitts.,Calif. C11	7.70	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ... 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 ....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ..6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 .....6.70‡
MartinsFerry,O. W10 .6.60*
Middletown,O. A10 ..6.60‡
Pittsburg,Calif. C11 ..7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ... 6.60†
Warren,O. R2 .. ....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.275

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ...9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.425
Niles,O.(28) R2 .....7.425
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).9.25
Butler,Pa. A10 (type 2).9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 ....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind Harbor,Ind. I-2,Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.65
Ind Harbor,Ind. I-2 ..8.175
Yorkville,O. W10 ....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precis on Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.

T2 Tenn. Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.925
Allenport,Pa. P7 .....4.925
Alton,Ill. L1 .....5.125
Ashland,Ky.(8) A10 ...4.925
Atlanta A11 ..... 5.125
Bessemer,Ala. T2 ....4.925
Birmingham C15 .....4.925
Buffalo(27) R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fontana,Calif. K1 ....5.775
Gary,Ind. U5 .....4.925
Houston S5 .....5.175
Ind.Harbor,Ind. I-2, Y1 4.925
Johnstown,Pa.(25) B2..4.925
KansasCity,Mo. S5 ....5.175
Lackaw'na,N.Y.(25) B2 4.925
LosAngeles(25) B3 ....5.675
Minnequa,Colo. C10 ....6.025
Pittsburg,Calif. C11 ..5.675
Riverdale,Ill. A1 .....4.925
SanFrancisco 87 .....6.35
Seattle(25) B3 .....5.925
Seattle N14 .....5.675
Sharon,Pa. S3 .....4.925
S.SanFrancisco(25) B3..5.675
SparrowsPoint,Md. B2.4.925
Sterling,Ill.(1) N15 ....4.925
Sterling,Ill. N15 .....5.025
Torrance,Calif. C11 ...5.675
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ...4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.10
Farrell,Pa. S3 .....8.10
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 ....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....8.10
Newport,Ky. A2 .....8.10
Sharon,Pa. S3 .....8.10
S.Chicago,Ill. W14 ....8.10
Youngstown U5, Y1 ....8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 ....7.325
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.425
Fairfield,Ala. T2 .... 7.325
Farrell,Pa. S3 .....7.325
Gary,Ind. U5 .....7.325
Houston S5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.325
KansasCity,Mo. S5 ....7.575
Lackawanna,N.Y. B2 ..9.325
LosAngeles(25) B3 .. 8.075
Seattle(25) B3 .....8.325
Sharon,Pa. S3 .....7.325
S.Chicago,Ill. W14 ....7.325
S.SanFrancisco(25) B3..8.075
SparrowsPoint,Md. B2..9.325
Warren,O. R2 .....7.325
Weirton,W.Va. W6 ....7.325
Youngstown U5, Y1 ...7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..5.175
Warren,O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.15
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland A7, J5 .....7.15
Conshohocken,Pa. A3 ..7.20
Dearborn,Mich. D3 ....7.25
Detroit D2, M1, P20...7.25
Dover,O. G6 .....7.15
Ecorse,Mich. G5 .....7.25
Evanston,Ill. M22 .....7.25
Follansbee,W.Va. F4 ...7.15
Fontana,Calif. K1 ....9.00
FranklinPark,Ill. T6 ...7.25
Ind.Harbor,Ind. Y1 ....7.15
Indianapolis C8 .....7.30
LosAngeles C1 .....9.20
NewBedford,Mass. R10 .7.60
NewBritain(10) S15 ...6.85
NewCastle,Pa. B4, E5 ..7.15
NewHaven,Conn. D2 ...7.60
New Kensington,Pa. A6 7.15
Pawtucket,R.I. R3 ....7.80
Pawtucket,R.I. N8 .....7.70
Philadelphia(45) P24 ... 7.70
Pittsburgh J5 .....7.15
Riverdale,Ill. A1 ..... 7.25
Rome,N.Y.(32) R6 ....7.15
Sharon,Pa. S3 .....7.15
Trenton,N.J.(31) R5 ...8.60
Wallingford,Conn. W2 ..7.60
Warren,O. R2, T5 .....7.15
Weirton,W.Va. W6 ....7.15
Worcester,Mass. A7 ....7.70
Youngstown J5, Y1 ....7.15

STRIP, Cold-Rolled Alloy

Boston T6 .....15.40
Carnegie,Pa. S18 ..... 15.05
Cleveland A7 .....15.25
Dover,O. G6 .....15.05
Farrell,Pa. S3 .....15.05
FranklinPark,Ill. T6 ..15.05
Harrison,N.J. C18 .....14.85
Indianapolis C8 .....14.70
Lowellville,O. S3 .....15.05
Pawtucket,R.I. N8 .... 15.40
Riverdale,Ill. A1 .....15.05
Sharon,Pa. S3 .....15.05
Worcester,Mass. A7 ...15.55
Youngstown J5 .....14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn,Mich. D3 ....10.60
Dover,O. G6 .....10.45
Ecorse,Mich. G5 .....10.55
Farrell,Pa. S3 .....10.50
Ind.Harbor,Ind. Y1 ...10.65
Sharon,Pa. S3 .....10.50
Warren,O. R2 .....10.45

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	*8.95*	*10.40*	*12.60*	*15.60*	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	...	10.10	12.30	15.30	18.25
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.60	15.60	18.55
Indianapolis C8	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	*11.15*	*12.60*	*14.80*	*17.80*	....
NewBritain,Conn.(10) S15	*8.95*	*10.40*	*12.60*	*15.60*	....
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	*8.95*	*10.40*	*12.60*	*15.60*	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	...	10.70	12.90	15.90	18.75
Warren,O. T5	*8.65*	*10.10*	*12.30*	*15.30*	*18.25*
Worcester,Mass. T6	9.50	10 70	12.90	15.90	18.85
Worcester,Mass. A7	*9.50*	*10.70*	*12.80*	*15.90*	*18.85*
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.10	21.95	26.30
Buffalo W12	...	...	17.10	....	....
FranklinPark,Ill. T6	...	...	17.45	21.30	25.65
Harrison,N.J. C18	...	...	17.10	20.95	25.30
NewYork W3	...	...	18.10	21.95	26.30
Palmer Mass. W12	...	...	17.10	....	....
Trenton,N.J. R5	...	...	18.10	21.95	26.30
Worcester,Mass. A7, T6..	...	...	17.10	20.95	25.30
Youngstown J5	...	...	17.45	21.30	25.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....7.15*
Evanston,Ill. M22 .....7.25*
Riverdale,Ill. A1 .....7.25*
Warren,O. B9, T5 ....7.15*
Worcester,Mass. A7 ...7.70*
Youngstown J5 .....6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11 ..... 5.65
Riverdale,Ill. A1 .....5.50
Sharon,Pa. S3 .....5.35
Youngstown U5 .....5.35

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.20	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.625*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2 ..	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.50	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10 (FP coils)	..	11.35	12.05	13.15	14.20

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4.	17.60	19.20	19.70	20.20	....	
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5 ..	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡
Zanesville,O. A10 ..	....	....	19.20	19.70	20.20	....

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40
ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif. K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va. W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85

Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.65
Aliquippa,Pa. J5 .....7.65
Alton,Ill. L1 .....7.85
Atlanta A11 .....7.85
Bartonville,Ill. K4 ....7.75
Buffalo W12 .....7.20
Chicago W13 .....7.65
Cleveland C20 .....7.20
Cleveland A7 .....7.65
Crawfordsville,Ind. M8 7.75
Donora,Pa. A7 .....7.65
Duluth A7 .....7.65
Fairfield,Ala. T2 .....7.65
Fostoria,O.(24) S1 .....7.75
Houston S5 .....7.90
Jacksonville,Fla. M8 ....8.00
Johnstown,Pa. B2 .....7.65
Joliet,Ill. A7 .....7.65
KansasCity,Mo. S5 .....7.90
Kokomo,Ind. C16 .....7.75
LosAngeles B3 .....8.60
Minnequa,Colo. C10 ....7.90
Monessen,Pa. P7, P16..7.65
N.Tonawanda,N.Y. B11.7.20
Palmer,Mass. W12 .....7.50
Pittsburg,Calif. C11 ...8.60
Portsmouth,O. P12 .....7.65
Rankin,Pa. A7 .....7.65
S.Chicago,Ill. R2 .....7.65
S.SanFrancisco C10 ....8.60
SparrowsPoint,Md. B2 ..7.75
Sterling,Ill.(1) N15 ....7.65
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....7.65
Waukegan,Ill. A7 .....7.65
Worcester,Mass. A7 ....7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 .....12.65
Buffalo W12 .....11.90
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....12.65
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P16 ..... 12.65
Muncie,Ind. I-7 .....12.85
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 .....12.20
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ...11.90
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ..12.75
Struthers,O. Y1 .....12.65
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Buffalo W12 .....8.70
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 .....9.55
LosAngeles B3 .....10.25
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16...9.30
NewHaven,Conn. A7 ...9.60
Palmer,Mass. W12 .....9.00
Pittsburg,Calif. C11 ..10.25
Portsmouth,O. P12 ....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ...10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. A7 ....9.60

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Bartonville,Ill. K4 .....9.40
Buffalo W12 .....9.025
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria,O. S1 .....9.345
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 .....9.55
LosAngeles B3 .....10.25
Milbury,Mass.(12) N6..9.325
Minnequa,Colo. C10 ....9.55
Monessen,Pa. P7, P16..9.30
Muncie,Ind. I-7 .....9.50
Palmer,Mass. W12 ....9.325
Pittsburg,Calif. C11 ...10.25
Portsmouth, O. P12 ....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ...10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester T6, W12....9.325
Worcester,Mass. A7, J4..9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....15.80
Bartonville,Ill. K4 ....15.70
Buffalo W12 .....14.45
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville,Ind. M8 15.70
Fostoria,O. S1 .....15.60
Houston S5 .....15.85
Jacksonville,Fla. M8 ...15.95
Johnstown Pa. B2 .....15.60
KansasCity,Mo. S5 ....15.85
Kokomo,Ind. C16 .....15.60
Minnequa,Colo. C10 ....15.85
Monessen,Pa. P7 .....15.60
Muncie,Ind. I-7 .....15.80
Palmer Mass. W12 ....14.75
S.SanFrancisco C10 ....16.45
Waukegan,Ill. A7 .....15.60
Worcester,Mass. A7, T6.15.90

ROPE WIRE

Bartonville,Ill. K4 ....12.75
Buffalo W12 .....12.00
Fostoria,O. S1 .....12.75
Johnstown,Pa. B2 .....12.75
Monessen,Pa. P7 .....12.00
Muncie Ind. I-7 .....12.95
Palmer,Mass. W12 ....12.30
Portsmouth,O. P12 ....12.75
Roebling,N.J. R5 .....13.05
SparrowsPt.,Md. B2 ...12.85
Struthers,O. Y1 .....12.75
Worcester,Mass. J4 ... 13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	16.55
Monessen,Pa. P16	15.45
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	11.65
Baltimore T6	11.95
Boston T6	11.95
Buffalo W12	10.75
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. M8	*11.65*
Dover,O. G6	11.65
Fostoria,O. S1	11.05
FranklinPark,Ill. T6	11.75
Kokomo,Ind. C16	*11.65*
Massillon,O. R8	11.65
Milwaukee C23	10.95
Monessen,Pa. P7, P16	11.65
NewKensington,Pa. A6	*11.65*
Palmer,Mass. W12	11.05
Pawtucket,R.I. NS	11.95
Philadelphia P24	*11.95*
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R5	11.95
Warren,O. B9	11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock — **Col.**

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	*175*
Donora,Pa. A7	173
Duluth A7	173
Houston,Tex. S5	178
Fairfield,Ala. T2	173
Jacksonville,Fla.(20) M8	*184*
Joliet,Ill. A7	173
Johnstown,Pa. B2	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md.,B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.95

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	*177*
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) M8	*186*
Joliet,Ill. A7	175
Johnstown,Pa. B2	175
Kokomo,Ind. C16	175
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	*10.36*
Bartonville,Ill. K4	10.36
Buffalo W12	9.82
Chicago W13	10.26
Crawfordsville,Ind. M8	*10.36*
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	*10.82*
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	*10.70*
Bartonville,Ill. K4	10.70
Buffalo W12	10.15
Chicago W13	10.60
Crawfordsville,Ind. M8	*10.70*
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	*11.16*
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
Los Angeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	*10.75*
Bartonville,Ill. K4	10.75
Buffalo W12	10.20
Chicago W13	10.65
Crawfordsville,Ind. M8	*10.75*
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	*11.21*
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	212
Atlanta A11	*214*
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	*214*
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla M8	*219*
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
Sterling,Ill.(7) N15	214
SparrowsPt.,Md. B2	214
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. W7	169
Johnstown,Pa. B2	172
Marion,O. P11	*173*
Minnequa,Colo. C10	177
Sterling,Ill.(7) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	*198**
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	*198*
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston,Tex. S5	198**
Jacksonville,Fla. M8	*203*
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196*
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198§

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	*192**
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	*192*
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston,Tex. S5	192**
Jacksonville,Fla. M8	*197*
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Monessen,Pa. 9 ga. P7	180*
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192§

WIRE (16 gage)	**Stone**	**An'ld Galv.**
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa.	J5 15.70	17.50
Bartonville K4	17.25	19.05
Cleveland A7	17.15	....
Crawf'dsville M8	*17.25*	*19.05*
Fostoria,O. S1	17.65	19.20†
Houston S5	17.40	18.95**
Jacksonville M8	*17.50*	*19.30*
Johnstown B2	17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	17.25	19.05†
Minnequa C10	17.40	18.95**
P'lm'r,Mass.W12	16.30	17.85†
Pitts.,Calif. C11	17.50	19.05†
SparrowsPt.	B2 17.25	19.05§
Sterling(37) N15	17.25	19.05§
Waukegan A7	17.15	18.70†
Worcester A7	17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	**An'ld Galv.**
Ala.City,Ala. R2	8.65 9.20**
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	*8.75 9.425**
Bartonville(48)K4	8.75 9.425
Buffalo W12	8.20 8.75†
Cleveland A7	8.65 ....
Crawfordsville M8	*8.75 9.425*
Donora,Pa. A7	8.65 9.20†
Duluth A7	8.65 9.20†
Fairfield T2	8.65 9.20†
Houston(48) S5	8.90 9.45**
Jacksville,Fla. M8	*9.00 9.675*
Johnstown B2(48)	8.65 9.325§
Joliet,Ill. A7	8.65 9.20†
Kans.City(48) S5	8.90 9.45**
Kokomo C16	8.75 9.30†
LosAngeles B3	*9.60 10.275§*
Minnequa C10	8.90 9.45**
Monessen P7(48)	8.65 9.25*
Palmer,Mass. W12	8.50 9.05†
Pitts.,Calif. C11	9.60 10.15†
Rankin,Pa A7	8.65 9.20†
S.Chicago R2	8.65 9.20**
S.SanFran. C10	9.60 10.15**
Spar'wsPt. B2(48)	8.75 9.425§
Sterling(48) N15	8.90 9.575§
Sterling(1)(48)	8.80 9.475§
Struth'rs,O.(48)Y1	8.65 9.30†
Worcester,Mass.A7	8.95 9.50†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)	
½ in. and smaller:	
6 in. and shorter	52.5
Longer than 6 in.	43.5
⅝ in. thru 1 in.:	
6 in. and shorter	43.5
Longer than 6 in.	41.5
1⅛ in. and larger:	
All lengths	41.5
Undersized Body (rolled thread)	
½ in. and smaller:	
6 in. and shorter	52.5

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	32.0
Longer than 6 in.	19.0
⅝ in. and larger:	
All lengths	16.0

Lag Bolts
All diameters:

6 in. and shorter	52.5
Longer than 6 in.	44.5

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	52.0
Larger than ½ in. or longer than 6 in.	44.5
Blank Bolts	44.5
Step, Elevator, Tire Bolts	52.0

Stove Bolts, Slotted

⅛ to ¼-in. incl.,	
3 in. and shorter	54.00
⅛ to ½ in., inclusive	54.00

NUTS

Reg. & Heavy Square Nuts:
All sizes 58.0

Square Nuts, Reg. &
Heavy, Hot Galvanized:
All sizes 44.0

Hex Nuts, Reg. &
Heavy, Hot Pressed:

¾ in. and smaller	61.5
⅞ in. to 1 in., incl.	57.5
1⅛ in. to 1½ in., incl.	62.5
1⅝ in. and larger	56.0

Hex Nuts, Reg. &
Heavy, Cold Punched:

¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller	48.0
⅞ in. to 1 in., incl.	44.0
1⅛ in. to 1½ in., incl.	49.0

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0

Hex Nuts, Finished (Incl. Slotted and Castillated):

1 in. and smaller	64.00
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

Semifinished Hex Nuts, Reg. (Including Slotted):

⅝ in. and smaller	61.5
¾ in. to 1 in., incl.	64.0
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:
6 in. and shorter:

⅝ in. and smaller	44.0
¾, ⅞ and 1 in. diam.	27.0
Longer than 6 in.:	
⅝ in. and smaller	14.0
¾, ⅞ and 1 in. diam.	0.5

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller	31.0
¾, ⅞ and 1 in. diam.	9.0

Longer than 6 in.:

⅝ in. and smaller	+6
¾, ⅞ and 1 in. diam.	+24

Flat Head Capscrews:
¾ in. and smaller ..+65.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:

6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.25
⅞ in. under list less 19%.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thicknes, cut lengths 10 to 24 ft, inclusive.

O.D.	B.W.	Seamless		Elec. Weld
In.	Gage	H.R.	C.D.	H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2½	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Huntington,W.Va. C15	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	....(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50
TIE PLATES				
Fairfield,Ala. T2	6.60			
Gary,Ind. U5	6.60			
Ind.Harbor,Ind. I-2	6.60			
Lackawanna,N.Y. B2	6.60			
Minnequa,Colo. C10	6.60			
Seattle B3	6.75			
Steelton,Pa. B2	6.60			
Torrance,Calif. C11	6.75			
JOINT BARS				
Bessemer,Pa. U5	6.975			
Fairfield,Ala. T2	6.975			
Ind.Harbor,Ind. I-2	6.975			
Joliet,Ill. U5	6.975			
Lackawanna,N.Y. B2	6.975			
Minnequa,Colo. C10	6.975			
Steelton,Pa. B2	6.975			
AXLES				
Ind.Harbor,Ind. S13	8.775			
Johnstown,Pa. B2	8.775			

TRACK BOLTS, Untreated

Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	*14.75*
Seattle B3	15.25

SCREW SPIKES
Lebanon,Pa. B2 ..... 14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	9.75
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	9.75
Seattle B3	10.25
S.Chicago,Ill. R2	9.75
Struthers,O. Y1	9.75
Youngstown R2	9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅝ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in; 6.70c; 1 15/16 to 8 in.; inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜"and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 6.045c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.50c.
(31) Widths over ⅝-in.; 7.60c, for widths ⅝-in and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(46) Special quality.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.5	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	*3.5*	*+23*	*8.5*	*+32*	*+19*	*+40.5*	*3.25*	*+12*	*6.25*	*+8*	*9.75*	*+3.5*	*12.25*	*+2.75*
Wheatland, Pa. W9	*5.5*	*+21*	*+6*	*+30*	*+17*	*+38.5*	*5.25*	*+10*	*8.25*	*+6*	*11.75*	*+1.5*	*14.25*	*+0.75*
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	*12.75*	*+1.75*	*13.25*	*+1.25*	*14.75*	*+1.5*	*14.75*	*+1.5*	*4.25*	*+12.5*	*4.25*	*+12.5*
Wheatland, Pa. W9	*14.75*	*0.25*	*15.25*	*0.75*	*16.75*	*0.5*	*16.75*	*0.5*	*6.25*	*+10.5*	*6.25*	*+10.5*
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.75	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.50	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.25	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.50	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.50	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.25	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	36.00	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.75	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.25	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.75	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.75	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.25	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.;Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
330	....	....	....	105.50	108.00
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb
Regular Carbon	0.290
Extra Carbon	0.345
Special Carbon	0.41-0.45
Oil Hardening	0.450
Cr Hot Work	0.45-0.495
W-Cr Hot Work	0.43-0.475
V-Cr Hot Work	0.460
Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	66.50
Tonawanda,N.Y. W12	*66.00*	*66.50*	*67.00*	*67.50*
N.Tonawanda,N.Y. T9	....	*66.50*	*67.00*	*67.50*
Boston, deld.	*77.29*	*77.79*	*78.29*	....
Rochester,N.Y., deld.	*69.02*	*69.52*	*70.02*	....
Syracuse,N.Y., deld.	*70.12*	*70.62*	*71.12*	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	*66.00*	....	*66.50*	
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee deld.	68.46	68.96	68.96	69.46
Muskegon,Mich., deld.	....	80.33	80.33	....
Cleveland District				
Cleveland R2, A7	*66.00*	*66.50*	*66.50*	*67.00*
Akron,O., deld.	*69.12*	*69.62*	*69.62*	*70.12*
Mid-Atlantic District				
Birdsboro,Pa. B10	*68.00*	*68.50*	*69.00*	*69.50*
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	74.70	75.20	....
Newark,N.J., deld.	72.02	72.52	73.02	73.52
Philadelphia, deld.	69.88	70.38	70.88	71.38
Troy,N.Y. R2	*68.00*	*68.50*	*69.00*	*69.50*
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa. deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, O. Y1	....	....	*66.50*	....
Sharpsville,Pa. S6	*66.00*	....	*66.50*	*67.00*
Youngstown Y1	....	....	*66.50*	*67.00*
Mansfield,O., deld.	*70.90*	....	*71.40*	*71.90*
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	66.50	67.00	67.50	....
Fontana,Calif. K1	72.50	73.00	....	....
Geneva,Utah C11	*66.00*	*66.50*		....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	*66.00*	*66.50*		....
Minnequa,Colo. C10	66.50	67.00	67.50	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,O. I-3	*66.00*	*66.50*	*66.50*	*67.00*
Cincinnati, deld.	*72.5¢*	*73.0¢*	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	77.25
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry. 12½ lb pigiets, 16% Si, max fr'gt allowed up to $9. K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles Tenn. T3 (Phos. 0.035% max)	$82.00
Rockwood,Tenn. T3 (Phos. 0.035% max)	82.00
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	81.76
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13§	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	7.88	8.98	9.76	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	10.12	....	8.20	8.16	10.31
Boston	9.26	10.35	11.41	....	9.30	9.63	....	15.19	9.54	9.60	11.08
Buffalo	7.85	9.00	10.68	....	8.05	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	7.78	9.00	9.65	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.65	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.55	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.03	9.25	10.00	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.80	9.75	10.99	....	7.75	8.05	10.65	15.00	8.00	8.80	10.30
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.10	10.30	11.25	57.45	9.15	9.20	12.10	15.50	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.93	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.13	9.35	10.05	....	8.17	8.42	8.70	....	8.55	8.51	...
New York	8.97	10.23	10.56	....	9.42	9.67	....	15.09	9.45	9.53	10.81
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	10.24	50.69	8.69	8.65	9.76	15.01	8.50	8.77	9.77
Pittsburgh	8.18	9.45	10.35	50.00	8.33	8.60	9.05	14.15	8.64	8.56	9.88
Portland, Oreg.	9.50	11.20	11.55	57.20	11.35‡‡	9.65	14.50	15.95	9.65	9.30	12.50
Richmond, Va.	8.00	....	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.54	9.29	10.41	....	8.59	8.97	9.41	15.45	9.10	8.93	10.25
St. Paul	8.39	9.59	10.26	....	8.43	8.68	9.21	....	8.94	8.90	10.10
San Francisco	9.05	10.40	10.65	53.45	9.05	9.15	12.55	15.60	9.15	9.30	11.55
Seattle	9.95	11.15	12.00	57.20	10.00	10.10	14.05	14.60	9.80	9.70	12.10
Spokane, Wash.	9.55	10.70	11.55	....	9.55	9.50	13.40	16.60	9.35	9.30	11.70
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 10.00c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **⅛-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N.J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96.75; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜-in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net tons, f.o.b. cars point of entry duty paid, metallurgical grade: European, $33-$34; Mexican, all-rail, duty paid, $25.25-$25.75; barge, Brownsville, Tex., $27.25-$27.75.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi river, ocean bags 23,000 lb and over.. F.o.b. Riverton or Camden, N.J., west of Mississippi river..	10.50 9.50
Sponge Iron, domestic, 98 + % Fe: Deld. east of Mississippi river, 23,000 lb and over F.o.b. Riverton, N.J., west of Mississippi river	10.50 9.50
Sponge Iron, Canadian: F.o.b. shipping point	9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

	Dollars
Aluminum: Atomized, 500 lb drum, fr'ght allowed Carlots ..... Ton lots	38.20 40.20
Antimony, 500 lb lots. 32.00*	
Brass, 5000-lb lots .....32.60-39.40†	
Bronze, 5000-lb lots .....50.20-54.70†	
Copper: Electrolytic .....14.25* Reduced 14.25*	
Lead 7.50*	
Manganese: Minus 35 mesh ... 64.00 Minus 100 mesh ... 70.00 Minus 200 mesh ... 75.00	
Nickel, unannealed ... $1.15	
Nickel-Silver, 5000-lb lots .....50.80-55.40†	
Phosphor-Copper, 5000-lb lots 62.00	
Copper (atomized) 5000-lb lots .....44.50-52.00‡	
Silicon 47.50	
Solder 7.00*	
Stainless Steel, 304 .. $1.08	
Stainless Steel, 316 .. $1.44	
Tin 14.50*	
Zinc, 5000-lb lots 18.00-31.20‡	
Tungsten: Melting grade, 99% 60 to 2000 mesh: 1000 lb and over ... 3.75 Less than 1000 lb .. 3.90	
Chromium, electrolytic 99.8% Cr min metallic basis 5.00	

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam.	Inches Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5½	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305...	$6.58	$6.53	$6.53	$6.76
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.50	8.45	8.45	8.75
Sheets, H.R.	8.50	8.45	8.45	8.75
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ⅝ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (§)	8.38	8.38	8.38	8.58

†Per 82-lb. net, reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	32.00-33.00

Tungsten Ore

Net ton unit, before duty

Foreign wolframite, good commercial quality	20.00-23.00
Domestic, concentrates mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account: other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$55.00-58.00
48% 2.8:1	52.00-55.00
48% no ratio	46.00-48.00
South African Transvaal	
48% no ratio	$40.00-41.00
44% no ratio	30.00-31.00
Turkish	
48% 3:1	$59.00-62.00
Domestic	
Rail nearest seller	
18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.10-3.60
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton	
Beehive Ovens	
Connellsville, furnace	$14.75-15.75
Connellsville, foundry	18.00-18.50
Oven Foundry Coke	
Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld	31.84
Kearny, N.J., ovens	29.75
Milwaukee, ovens	30.50
Painesville,O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens.	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.80 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens	
Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00
Per ton, bulk, ovens	
Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $255, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb of contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lots 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk, 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13c per lb of contained Si. Packed c.l. 15.5c, ton lot 16.95c, less ton 18.6c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 20.00c per lb of Si. Packed, c.l. 21.65c, ton lot 22.95c, less ton 23.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (1 to 2%). Contract, lump, carload 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅛ lb each and containing 2 lb of Cr). Contract, carload, bulk 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3⅛ lb and containing 2 lb of Mn and approx ⅛ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2¼ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2¼ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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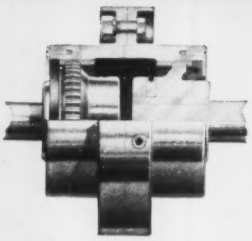

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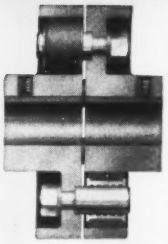

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Scrap Prices Are Still Slipping

STEEL's composite on the prime grades declines another 33 cents to $54. Market undertone appears strong at some points despite the absence of a thorough buying test

Scrap Prices, Page 186

Philadelphia — Continued dullness in the market has led to a further decline in prices. No. 1 heavy melting, No. 1 bundles and No. 1 busheling have dropped to $53-$54, delivered; No. 2 heavy melting to $46-$47, and No. 2 bundles to $43.50-$44.50. Electric furnace bundles have slipped to $55-$56, delivered.

Mixed borings and turnings are lower at $37, short shoveling turnings at $38-$39, machine shop turnings at $35-$36, and heavy turnings at $49-$50. Low phos structurals and plates and railroad specialties are steady.

Heavy breakable cast has been sold at $53, off $2. No. 1 cupola at $48, delivered, and drop broken machinery at $57, delivered, are off nominally about $1 a ton.

New York — Brokers' buying prices are unchanged, with scrap supply and consumption in fair balance. In general, the market is dull.

Chicago — Although consumers are buying scrap sparingly, strength in the market has firmed up prices $1 to $4 a ton on a few grades. The biggest nudge is on railroad grades. To complete old orders, brokers are finding it necessary to pay dealers $1 to $2 more than previously. Dealers appear content to hold material off the market since they anticipate a high price will come with the first upturn in the district steel rate. Scrap generation is at the year's low point this month because of vacation closings, but that does not appear to be the factor pushing up prices.

Pittsburgh—The only mill purchases in the past week involved secondary grades. One producer bought No. 2 bundles for $47 and No. 2 heavy melting for $50. There was no change in No. 2 heavy melting price from the previous week, but the bundles were $1 per ton below earlier levels.

Cleveland — The scrap market lacks a buying test. Quoted prices are largely nominal. Auto lists for July are beginning to close, and the outcome of bids on these lots over the next week or so will determine pretty much the level of the market on industrial material.

Cincinnati — The scrap market here continues in the summer doldrums. A buying test of prices is lacking. Brokers are filling old orders, but with many metalworking plants closed for vacations, the flow of scrap to dealers is off.

St. Louis—The scrap market is stronger, although new sales are absent to provide a test of quoted prices. Mill interest in stockpiling is improving in anticipation of higher steel operations in September and October.

Rural and industrial scrap shipments are off sharply. Dealers report a shortage of the cast grades. Foundries are unable to obtain desired tonnages.

Buffalo—A sale of cupola cast at $48, up $2 a ton, was made last week in a generally dull market. No. 1 machinery cast also was advanced $2, rising to $53. The price increase on cast reflects a firm market undertone despite the lack of active buying. The Buffalo area steel mills are not expected back in the market before early August. Prices on the steel grades are nominally unchanged. Dealers' yard supplies are light.

Detroit—The surprise purchase of a small tonnage of No. 2 heavy melting steel at $49 by Great Lakes Steel Corp. caused a bit of a stir in the local scrap market last week. Great Lakes has traditionally stayed out of this market because Ford's price on foundry steel hasn't made it worth-while. With No. 2 heavy melting up, No. 2 bundles are expected to advance, though no orders for that grade have come through.

Birmingham—Open-hearth scrap prices are unchanged here, but an Atlanta mill raised its buying price for No. 2 heavy melting to $45, up $2 from its last purchase. Dealers are resisting lower prices. Electric furnace items are higher. Some small consumers are paying premiums for hard-to-get specialties. Railroad lists show increases. The cast grades are steady.

San Francisco — Mill purchases of scrap are light; exports have tapered off.

Los Angeles—Mill scrap purchases are off, one major consumer being out of the market completely. Dealers expect the situation to remain unchanged through the summer, or until mill inventories have been substantially reduced.

Washington — Consumption of ferrous materials (scrap and pig iron) in May totaled 11,615,000 gross tons, reports the U.S. Bureau of Mines. Of this total, 5,753,000 tons (49.5 per cent) were scrap, and 5,862,000 tons (50.5 per cent) were pig iron. This compares with

(*Please turn to page* 192)

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, July 24, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 24	$54.00
July 17	54.33
July 1952	42.60
June Avg.	54.89
July 1956	47.70

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	55.00-56.00
No. 2 heavy melting	49.00-50.00
No. 1 factory bundles	62.00-63.00
No. 1 dealer bundles	56.00-57.00
No. 2 bundles	*46.00-47.00*
No. 1 busheling	56.00-57.00
Machine shop turnings	33.00-34.00
Mixed borings, turnings	33.00-34.00
Short shovel turnings	37.00-38.00
Cast iron borings	37.00-38.00
Cut structurals:	
2 ft and under	63.00-64.00
3 ft lengths	62.00-63.00
Heavy turnings	49.00-50.00
Punchings & plate scrap	62.00-63.00
Electric furnace bundles	62.00-63.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	47.00-48.00
Unstripped motor blocks	36.00-37.00
No. 1 machinery cast	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	64.00-65.00
Rails, 2 ft and under	75.00-76.00
Rails, 18 in. and under	76.00-77.00
Rails, random lengths	73.00-74.00
Railroad specialties	73.00-74.00

Stainless Steel Scrap

18-8 bundles & solids	300.00-315.00
18-8 turnings	190.00-215.00
430 bundles & solids	80.00-85.00
430 turnings	55.00-60.00

CLEVELAND

No. 1 heavy melting	51.00-52.00
No. 2 heavy melting	46.00-47.00
No. 1 factory bundles	55.00-56.00
No. 1 bundles	51.00-52.00
No. 2 bundles	43.00-44.00
No. 1 busheling	51.00-52.00
Machine shop turnings	20.00-21.00
Short shovel turnings	25.00-26.00
Mixed borings, turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut foundry steel	55.00-56.00
Cut structurals, plates 2 ft and under	*60.00-61.00*
Low phos. punchings & plate	54.00-55.00
Alloy free, short shovel turnings	28.00-29.00
Electric furnace bundles	54.00-55.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Charging box cast	43.00-44.00
Heavy breakable cast	41.00-42.00
Stove plate	50.00-51.00
Unstripped motor blocks	37.00-38.00
Brake shoes	41.00-42.00
Clean auto cast	54.00-55.00
Burnt cast	39.00-40.00
Drop broken machinery	56.00-57.00

Railroad Scrap

No. 1 R.R. heavy melt.	57.00-58.00
R.R. malleable	61.00-62.00
Rails, 2 ft and under	75.00-76.00
Rails, 18 in. and under	76.00-77.00
Rails, random lengths	68.00-69.00
Cast steel	63.00-64.00
Railroad specialties	65.00-66.00
Uncut tires	63.00-64.00
Angles, splice bars	67.00-68.00
Rails, rerolling	73.00-74.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	300.00-310.00
18-8 turnings	200.00-210.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	54.00-55.00
No. 2 heavy melting	49.00-50.00
No. 1 bundles	54.00-55.00
No. 2 bundles	46.00-47.00
No. 1 busheling	54.00-55.00
Machine shop turnings	20.00-21.00
Short shovel turnings	26.00-27.00
Cast iron borings	26.00-27.00
Low phos.	59.00-60.00
Electric furnace bundles	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	63.00-64.00

CHICAGO

No. 1 heavy melt., indus.	54.00-55.00
No. 1 hvy melt., dealer	51.00-52.00
No. 2 heavy melting	44.00-45.00
No. 1 factory bundles	57.00-58.00
No. 1 dealer bundles	53.00-54.00
No. 2 bundles	41.00-42.00
No. 1 busheling, indus.	54.00-55.00
No. 1 busheling, dealer	51.00-52.00
Machine shop turnings	*33.00-34.00*
Mixed borings, turnings	*35.00-36.00*
Short shovel turnings	*35.00-36.00*
Cast iron borings	*35.00-36.00*
Cut structurals, 3 ft.	*58.00-59.00*
Punchings & plate scrap	*59.00-60.00*

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	45.00-46.00
Unstripped motor blocks	35.00-36.00
Clean auto cast	*53.00-54.00*
Drop broken machinery	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*58.00-59.00*
R.R. malleable	62.00-63.00
Rails, 2 ft and under	*79.00-80.00*
Rails, 18 in. and under	*80.00-81.00*
Angles, splice bars	67.00-68.00
Rails, rerolling	*79.00-80.00*

Stainless Steel Scrap

18-8 bundles & solids	315.00-325.00
18-8 turnings	215.00-225.00
430 bundles & solids	75.00-80.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	48.00-49.00
No. 2 heavy melting	*42.00*
No. 1 bundles	48.00-49.00
No. 2 bundles	*41.00*
No. 1 busheling	48.00-49.00
Machine shop turnings	27.00-28.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	29.00-30.00
Punchings & plate scrap	59.00-60.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	38.00
Unstripped motor blocks	28.00
Clean auto cast	50.00
Malleable	52.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	45.50
No. 2 heavy melting	43.00
No. 1 bundles	45.50
No. 2 bundles	38.00
No. 1 busheling	45.50
Machine shop turnings	30.00
Short shovel turnings	32.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	43.00

Railroad Scrap

No. 1 R.R. heavy melt.	57.00
Rails, 18 in. and under	74.00
Rails, random lengths	67.00
Rails, rerolling	72.00
Angles, splice bars	62.00

PHILADELPHIA

No. 1 heavy melting	*53.00-54.00*
No. 2 heavy melting	*46.00-47.00*
No. 1 bundles	*53.00-54.00*
No. 2 bundles	*43.50-44.50*
No. 1 busheling	*53.00-54.00*
Electric furnace bundles	*55.00-56.00*
Mixed borings, turnings	*37.00*
Short shovel turnings	*38.00-39.00*
Machine shop turnings	*35.00-36.00*
Heavy turnings	*49.00-50.00*
Structurals & plate	59.00-60.00
Couplers, springs, wheels	66.00
Rail crops, 2 ft & under	69.00-71.00

Cast Iron Grades

No. 1 cupola	*48.00*
Heavy breakable cast	*53.00*
Malleable	62.00
Drop broken machinery	*57.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	51.00-52.00
No. 2 heavy melting	41.00-42.00
No. 1 bundles	51.00-52.00
No. 2 bundles	40.00-41.00
Machine shop turnings	26.00-27.00
Mixed borings, turning	27.00-28.00
Short shovel turnings	29.00-30.00
Low phos. (structural & plate	54.00-55.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	39.00-40.00
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips, solids	280.00-290.00
18-8 borings, turnings	175.00-185.00
430 sheets, clips, solids	60.00-70.00
410 sheets, clips, solids	50.00-55.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	43.00-44.00
No. 2 bundles	*33.00-34.00*
No. 1 busheling	42.00-43.00
Machine shop turnings	24.00-25.00
Mixed borings, turnings	27.00-28.00
Short shovel turnings	28.00-29.00
No. 1 cast	34.00-35.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	42.00-43.00

BUFFALO

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	46.00-47.00
No. 2 bundles	36.00-37.00
No. 1 busheling	46.00-47.00
Mixed borings, turnings	35.00-36.00
Machine shop turnings	33.00-34.00
Short shovel turnings	36.00-37.00
Cast iron borings	35.00-36.00
Low phos.	53.00-54.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*47.00-48.00*
No. 1 machinery	*52.00-53.00*

Railroad Scrap

Rails, random lengths	61.00-62.00
Rails, 3 ft and under	66.00-67.00
Railroad specialties	59.00-60.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	51.00-52.00
No. 2 heavy melting	44.00-45.00
No. 1 bundles	51.00-52.00
No. 2 bundles	42.00-43.00
No. 1 busheling	51.00-52.00
Machine shop turnings	32.00-33.00
Mixed borings, turnings	30.00-31.00
Short shovel turnings	35.00-36.00
Cast iron borings	30.00-31.00
Low phos. 18 in.	56.00-57.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	42.00-43.00
Charging box cast	42.00-43.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	55.00-56.00
Rails, 18 in. and under	70.00-71.00
Rails, random lengths	62.00-63.00

BIRMINGHAM

No. 1 heavy melting	49.00-50.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	49.00-50.00
No. 2 bundles	37.00-38.00
No. 1 busheling	49.00-50.00
Cast iron borings	28.00-29.00
Short shovel turnings	*37.50-38.50*
Machine shop turnings	*36.50-37.50*
Bar crops and plates	*55.00-56.00*
Structurals & plate	*55.00-56.00*
Electric furnace bundles	*51.00-52.00*
Electric furnace:	
3 ft and under	*49.00-50.00*
2 ft and under	*48.00-49.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Unstripped motor blocks	44.00-45.00
Charging box cast	34.00-35.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*55.00-56.00*
Rails, 18 in. and under	65.00-66.00
Rails, rerolling	*75.00-76.00*
Rails, random lengths	59.00-60.00
Angles, splice bars	*60.00-61.00*

SEATTLE

No. 1 heavy melting	49.00
No. 2 heavy melting	44.00
No. 1 bundles	44.00
No. 2 bundles	32.00
Machine shop turnings	29.00
Mixed borings, turnings	29.00
Electric furnace No. 1	55.00

Cast Iron Grades

No. 1 cupola	45.00
Heavy breakable cast	37.00
Unstripped motor blocks	32.50
Stove plate (f.o.b. plant)	30.00

LOS ANGELES

No. 1 heavy melting	46.00
No. 2 heavy melting	43.00
No. 1 bundles	45.00
No. 2 bundles	38.00
Machine shop turnings	32.00
Shoveling turnings	34.00
Cast iron borings	32.00
Cut structural and plate, 1 ft and under	61.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	53.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00

SAN FRANCISCO

No. 1 heavy melting	48.00
No. 2 heavy melting	46.00
No. 1 bundles	47.00
No. 2 bundles	35.00
Machine shop turnings	32.00
Mixed borings, turnings	32.00
Cast iron borings	32.00
Heavy turnings	32.00
Short shovel turnings	34.00
Cut structurals, 3 ft	56.00

Cast Iron Grades

No. 1 cupola	53.00
Charging box cast	45.00-47.00
Stove plate	46.00
Heavy breakable cast	40.00
Unstripped motor blocks	48.00
Clean auto cast	55.00
No. 1 wheels	48.00
Drop broken machinery	53.00

HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	35.00
Mixed borings, turnings	19.00
Busheling, new factory:	
Prepared	43.00
Unprepared	37.00
Short steel turnings	30.00
Rails, rerolling	49.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

Luria Brothers and Company, Inc.

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EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

Aluminum Price Hike Looms

Across-the-board increase of 4 to 7 per cent seen by Aug. 1. Overproduction still plagues copper and zinc, but prices should hold for the present

Nonferrous Metal Prices, Pages 190 & 191

PRIMARY aluminum producers are set to revise prices upward. Consensus is the hikes will go into effect Aug. 1, although some companies may announce sooner.

People in the industry still go along with earlier estimates that the increase will amount to 1 cent a pound for pig. Mill products will probably be bumped 4 to 7 per cent. Added labor costs and an across-the-board increase in other expenses are pegged as the reasons.

Though the industry has come in for some criticism lately, producers aren't too worried about customer resistance to higher prices. As one observer put it: "Manufacturers of finished products are not generally dependent on aluminum prices for their profit margin. After all, how much effect will our price rise have on a company making an 8-lb aluminum chair already selling for $12?"

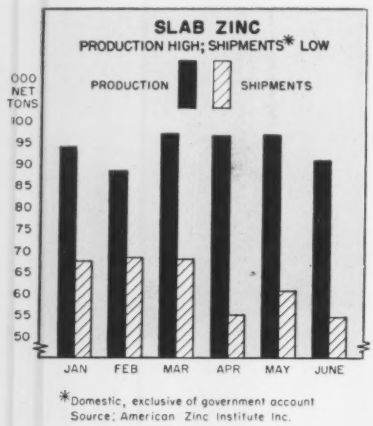
It's still believed that production and sales will be a little below what they were in record-breaking 1956. U.S. primary production hit 823,969 tons in the first half, down 4 per cent (36,335 tons) from 1956's first half, reports the Aluminum Association, New York. Association Secretary Donald M. White says primary production in the second half "is expected to reach levels slightly above those of the first half."

The strike continues at Aluminium Ltd.'s Arvida, Que., facilities. Officials say it has cost over 65,000 tons in production and $30 million in sales so far.

Zinc Stabilizing?

Zinc people hope for the best, but there's still no general agreement on whether prices will stabilize. If prices can hold the line until September, sales will pick up, many observers believe.

One producer sums up the situation: "When consumers feel the market is stable, they'll start buying again. They're certainly not going to place large orders today as long as they feel the price might drop tomorrow."



The trickle of production curtailments continues. Last week U.S. Steel Corp.'s Tennessee Coal & Iron Division cut the work week at its Jefferson City, Tenn., mines to four days. Consolidated Mining & Smelting Co. of Canada Ltd., closed down two primary facilities. Another development: Peru suspended the 4 per cent duty on lead and zinc exports because of low prices in the U.S. market.

Observers say present curtailments (over 11,000 tons monthly) are not enough. Proof: Domestic production for June stood at 90,719 tons (see chart), while total shipments were 69,957. Since the first of the year, domestic production has averaged 93,756 tons monthly. Add to this the high imports, and it's easy to see why the industry is still worried.

Some people believe the industry will have to hold production to 75,000-80,000 tons monthly before the price will stabilize. One qualification: A strong fourth quarter pickup could make further curtailments unnecessary.

Copper: More Woes

Two developments made news on the copper scene: 1. Custom smelters cut their price another 0.25-cent to 28.25 cents a pound. 2. The price for primary Katanga copper has been lowered to 26.70 cents a pound, c.i.f. New York.

While both developments conceivably could help to weaken the domestic primary price (29.25 cents a pound), it's not likely. Reasons: 1. Only 1 cent now separates the primary and domestic prices, a spread not considered dangerous. 2. Little Katanga copper is being sold here.

Complicating the copper picture is continued overproduction. Domestic refined production for the first six months totaled 846,730 tons, well ahead of last year's.

(*Please turn to page* 191)

NONFERROUS PRICE RECORD

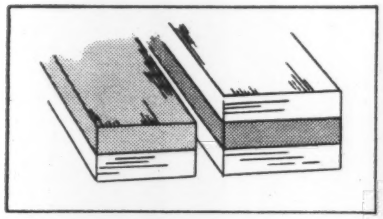
	Price July 24	Last Change	Previous Price	June Avg	May Avg	July, 1956 Avg
Aluminum	27.10	Aug. 10, 1956	25.90	27.100	27.100	25.900
Copper	28.50-29.25	July 1, 1957	29.00-29.25	30.250	31.087	40.030
Lead	13.80	June 11, 1957	14.80	14.120	15.185	15.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	33.750
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	96.125	July 24, 1957	95.875	98.080	98.341	96.435
Zinc	10.00	July 1, 1957	10.50	10.840	11.923	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

BRIDGEPORT BRASS
COPPER ALLOY BULLETIN

Reporting New Developments in Copper-Brass Alloys and Metalworking Methods

Bridgeport Metal Laminates Open Up New Design Horizons



Bridgeport Metal Laminates offer outstanding design and production opportunities no single metal provides. Bonded in double or triple layers by a specially developed brazing process, they have exceptional shear strength, do not peel, chip or crack. Since the bond is a true metallurgical one, there is no porosity. Because of the variety of metals that can be bonded, laminates offer a limitless range of properties: "dual" corrosion resistance, improved electrical and thermal conductivity, greater strength-to-weight ratios, etc.

Combinations of copper, brass, stainless steel, Muntz metal, Monel, mild steel, iron and precious metals are some of the metals that are available in Bridgeport Metal Laminates.

In Duplex Laminates, either component can vary in thickness from .010 to 2 inches. They are made in sizes up to 30 inches square and, in many cases, even larger.

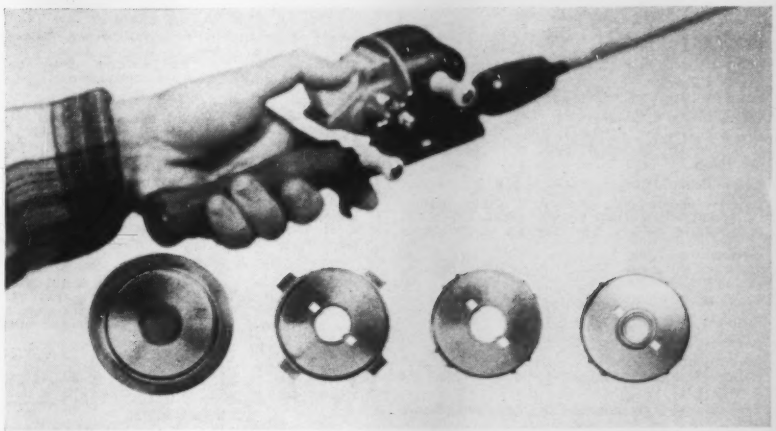
Triplex Laminates vary in component thickness from approximately .015 to 2 inches.

Applications for Bridgeport Laminates are many and varied—including copper/stainless steel frying pans, heat exchanger tube sheets, salt pots, electric terminal strips and contact parts.

Text samples of Bridgeport Metal Laminates are available through any Bridgeport Sales Office. Complete details on existing laminates and assistance on your special requirements are available through your Bridgeport Salesman.

For more complete details send for your copy of the new 12-page bulletin, BRIDGEPORT METAL LAMINATES.

Brass Alloys Add Extra Performance Factor to a "Failure-Proof" Fishing Reel



Shown are four progressive steps in manufacture of line pickup assembly for Bronson's Spin King reel.

Fishing for ideas? This reel life story may line up some for you

The Bronson Reel Company, Bronson, Michigan, manufactures the Spin King fishing reel. An extremely important part of the Spin King is the line pickup assembly which winds the line on the reel spool. Because of its unique, ingenious design, this pickup assembly can't twist and snag the line.

Uses Bridgeport Alloys

The pickup assembly is made from Bridgeport 37 (70-30 Cartridge Brass) and Bridgeport 6 (Free-cutting Brass) for an internal ratchet in the assembly.

Four steps are required to form the pickup before it is hard chrome-plated prior to final assembly. Starting with quarter-hard brass strip, the pickup is first blanked and partially formed as shown above. The second step calls for trimming and piercing, followed by a reforming operation. Finally, the assembly is ground to its exact outside diameter.

The serrated brass ratchet is milled and staked into the pickup after the latter has been plated.

Cartridge Brass Characteristics

The great strength and high ductility of Bridgeport 70-30 Cartridge Brass make it an ideal—and dependable—choice for this type of product. Operating without failure is one of the first demands made on this alloy. Its easy adaptability to successive and varied drawing, spinning and cold-heading operations makes it especially suitable for many finished products and components where these requirements are essential. Because of this, Bridgeport 70-30 Cartridge Brass is universally used for small arms ammunition, musical instruments, lamp reflectors and laboratory instrument cases of every description.

Free-cutting Brass offers similar advantages for parts that may require extensive machining. It's a high quality metal with excellent working characteristics.

Engineering Cooperation

The outstanding qualities of Bridgeport 70-30 Cartridge Brass or Bridgeport Free-Machining Brass may be just what you're looking for for your product or process. You can be sure that the full facilities of Bridgeport's Technical Service are at your disposal to help solve whatever copper alloy problems you may have. Your Bridgeport Salesman is your direct link to long experience and unparalleled research facilities. Call him today.

BRIDGEPORT BRASS

Bridgeport Brass Company, Bridgeport 2, Connecticut • Offices in Principal Cities
In Canada: Noranda Copper and Brass Limited, Montreal

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 241, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100-lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 29.25 deld. Conn. valley; 29.25 deld. Midwest; custom smelters, 28.25; lake, 29.25 deld.; fire refined, 29.00 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-110 nom. per troy oz.

Lead: Common, 13.80; chemical, 13.90; corroding, 13.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 13 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (die casting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz, nom.

Palladium: $23-24 per troy oz.

Platinum: $89-95 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $10.50 per lb, commercial grade.

Silver: Open market, 90.25 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $58.06 per lb; sheet, $45.36 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N.Y., spot, 96.125; prompt, 96.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.60.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-29.00; No. 12 foundry alloy (No. 2 grade), 22.25-23.00; 5% silicon alloy, 0.60 Cu max., 26.00-26.25; 13 alloy, 0.60 Cu max., 26.00-26.25; 195 alloy, 25.75-26.00; 108 alloy, 23.25-23.50. Steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 24.50; grade 2, 22.75; grade 3, 21.75; grade 4, 20.75.

Brass Ingot: Red brass, No. 115, 29.50; tin bronze, No. 225, 39.00; No. 245, 33.50; high-leaded tin bronze, No. 305, 33.50; No. 1 yellow, No. 405, 24.00; manganese bronze, No. 421, 27.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.80, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.77, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 34.605; l.c.l., 35.23. Weatherproof, 30,000-lb lots, 35.72; l.c.l., 36.47. Magnet wire deld., 15,000 lb or more, 41.93; l.c.l., 42.68.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.50 per cwt; pipe, full coils, $19.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates, 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.50-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.30
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. width or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-Finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
Rolled				
1.125-1.500	55.20	53.90	59.00	56.10
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$18.75	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Thread plate, .188 in., 71.70; .250-2.00 in., 70.60. Tooling plates, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 10.00-10.50; borings and turnings, 6.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	51.38b	48.61c	....	51.57	25.250	25.250	24.500
Yellow Brass	44.69	32.87d	45.23	47.60	19.125	18.875	17.375
Low Brass, 80%	47.40	47.34	47.94	50.21	21.375	21.125	20.625
Red Brass, 85%	48.36	48.30	48.90	51.17	22.250	22.000	21.500
Com. Bronze, 90%	49.86	49.80	50.40	52.42	23.125	22.875	22.375
Manganese Bronze	52.52	46.69	57.19	....	17.625	17.375	16.875
Muntz Metal	46.94	42.75	....	....	17.875	17.625	17.125
Naval Brass	48.85	43.16	55.91	52.26	17.625	17.375	16.875
Silicon Bronze	55.96	55.15	56.00	57.97e	24.750	24.500	24.750
Nickel Silver, 10%	61.52	63.85g	63.85	....	25.750	25.000	12.875
Phos. Bronze, A-5%	70.47	70.97	70.97	72.15	26.250	26.000	25.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

7.00; crankcases, 10.00-10.50; industrial castings, 10.00-10.50.

Copper and Brass: No. 1 heavy copper and wire, 21.00-21.50; No. 2 heavy copper and wire, 19.50-20.00; light copper, 17.00-17.50; No. 1 composition red brass, 18.50-19.00; No. 1 composition turnings, 18.00-18.50; yellow brass turnings, 10.75-11.25; new brass clippings, 17.00-17.50; light brass, 10.50-11.00; heavy yellow brass, 12.50-13.00; new brass rod ends, 14.50-15.00; auto radiators, unsweated, 13.50-14.00; cocks and faucets, 14.50-15.00; brass pipe, 15.50-16.00.

Lead: Heavy 9.50-10.00; battery plates, 4.25-4.50; linotype and stereotype, 11.50-12.00; electrotype, 10.00-10.50; mixed babbitt, 11.00-11.50.

Monel: Clippings, 45.00-53.00; old sheets, 44.00-53.00; turnings, 35.00-43.00; rods, 45.00-53.00.

Nickel: Sheets and clips, 85.00-90.00; rolled anodes, 85.00-90.00; turnings, 70.00-75.00; rod ends, 85.00-90.00.

Zinc: Old zinc, 3.00-3.25; new die-cast scrap, 2.75-3.00; old die-cast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.50-18.50; 3003 clippings, 17.50-18.50; 6151 clippings, 17.50-18.50; 5052 clippings, 17.50-18.00; 2014 clippings, 17.00-18.00; 2017 clippings, 17.00-18.00; 2024 clippings, 17.00-18.00; mixed clippings, 16.00-17.00; old sheets, 14.00-15.00; old cast, 14.00-15.00; clean old cable (free of steel), 17.50-18.50; borings and turnings, 15.00-16.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 51.00; light scrap, 46.00; turnings and borings, 31.00.

Copper and Brass: No. 1 heavy copper and wire 24.25; No. 2 heavy copper and wire, 22.75; light copper, 20.50; refinery brass (60% copper) per dry copper content, 22.125.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 24.25; No. 2 heavy copper and wire, 22.75; light copper, 20.50; No. 1 composition borings, 21.25; No. 1 composition solids, 21.50; heavy yellow brass solids, 15.50; yellow brass turnings, 14.50; radiators, 16.50.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 47.54; oval, 45.75, 5000-10,000 lb; electrodeposited, 39.50, 2000-5000 lb lots; cast, 41.00, 5000-10,000 quantities.

Nickel: Depolarized, less than 100 lb, 101.50; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 114.50; 200-499 lb, 113.00; 500-999 lb, 112.50; 1000 lb or more, 112.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30, f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 74.80; 300-900 lb, 72.80.

Copper Sulphate: 100-1900 lb, 15.20; 2000-5900 lb, 13.20; 6000-11,900 lb, 12.95; 12,000-22,900 lb, 12.70; 23,000 lb or more, 12.20.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400-4900 lb, 35.50; 5000-29,900 lb, 33.50; 30,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 76.30; 100-600 lb, 67.20; 700-1900 lb, 64.50; 2000-9900 lb, 62.60; 10,000 lb or more, 61.30.

Stannous Chloride (anhydrous): Less than 25 lb, 165.90; 25 lb. 130.90; 100 lb, 115.90; 400 lb, 113.50; 5200-19,600 lb, 101.30; 20,000 lb or more, 89.10.

Stannous Sulphate: Less than 50 lb, 128.70; 50 lb, 98.70; 100-1900 lb, 96.70; 2000 lb or more, 94.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from page* 188)

But during the same period, domestic deliveries to fabricators were only 674,106 tons. Unsold stocks are at an eight-year high of 165,549 tons. If last week's labor trouble in Africa continues, it may help dry up some of the excess stocks.

CHEMICAL ENGINEER

COKE PLANT

We have an opening in our organization for an Assistant Superintendent, between 34 and 45 years of age, with 10 to 15 years practical experience in operations, including at least 5 years in supervision. Minimum educational background graduate Chemical Engineer, or equivalent. Must have a thorough knowledge of all phases of coke plant production and know how to handle men effectively. Salary open. Attractive retirement plan; midwest location, desirable for family living. Give full details in first reply.

Write Box 573, STEEL

Penton Bldg. Cleveland 13, Ohio

VICE PRESIDENT
Rod-Bar-Sheet Steel Mill
$40,000 up
Plus Excellent Bonus, etc.

Administrative executive with engineering or metallurgist degree to supervise Sales, Finance and the manufacture of basic steel such as Rods-Bars-Sheets. Will train for executive V.P. of a large organization. A second or third man in a similar organization could qualify.

Engineers-Metallurgists
Staff Executives
With rolling mill experience

All expense paid by client
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Wabash Agency 202 S. State Chicago

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DISTRIBUTORSHIPS WANTED

Connecticut concern established 53 years seeking new lines for direct selling to all industrial plants, heating and electrical contractors. Engineering department available if necessary for the sale of product. State if item ever sold in Connecticut and send catalogs, prices, discounts and any other pertinent information to BOX 571, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

WANTED ENGINEERS, DRAFTSMEN, AND layouts. One of the leading structural steel and plate fabricating companies in Florida (located in Central Florida). Ideal working conditions; air conditioned office, co-benefits, insurance, hospitalization, vacation, and holidays. Write Box 574, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

EXECUTIVE

STEEL WAREHOUSE MANAGER—Experienced; Sales, office, procurement, inventory control, production flow, pricing and layout. Presently: General Manager for a sheet warehouse. Interested in future as managing executive or sales manager. Eighteen years of sales and supervision. References available. Will relocate. Age 38. Write Box 572, STEEL, Penton Bldg., Cleveland 13, Ohio.

Save on Your
INDUSTRIAL
TRACK
FULLY
GUARANTEED
FOSTER
QUALITY
RELAYING RAILS
Handle more cars better—cost less to install and maintain. Foster stocks all Rail Sections 12# thru 175#, Switch Material and Track Accessories.
SEND FOR CATALOGS
RAILS - TRACK EQUIPMENT - PIPE - PILING
L.B. FOSTER co.
PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
ATLANTA 8 • HOUSTON 2 • LOS ANGELES 5

Galvanizing Worries?
End Them by Contacting—
NATIONAL GALVANIZING COMPANY

Who will:

1. Do your galvanizing for you in the world's most modern and efficient galvanizing plant (which we would like you to consider your own private galvanizing department).
   OR
2. Build and operate complete job galvanizing facilities in your city.
   OR
3. Engineer and install modern, low-cost facilities to replace outmoded galvanizing operations.

NATIONAL GALVANIZING COMPANY
4000 Grand Avenue
Pittsburgh 25, Pa.
Galvanizing facilities to process 200 tons of job work per day

INDUSTRIAL ENGINEERS

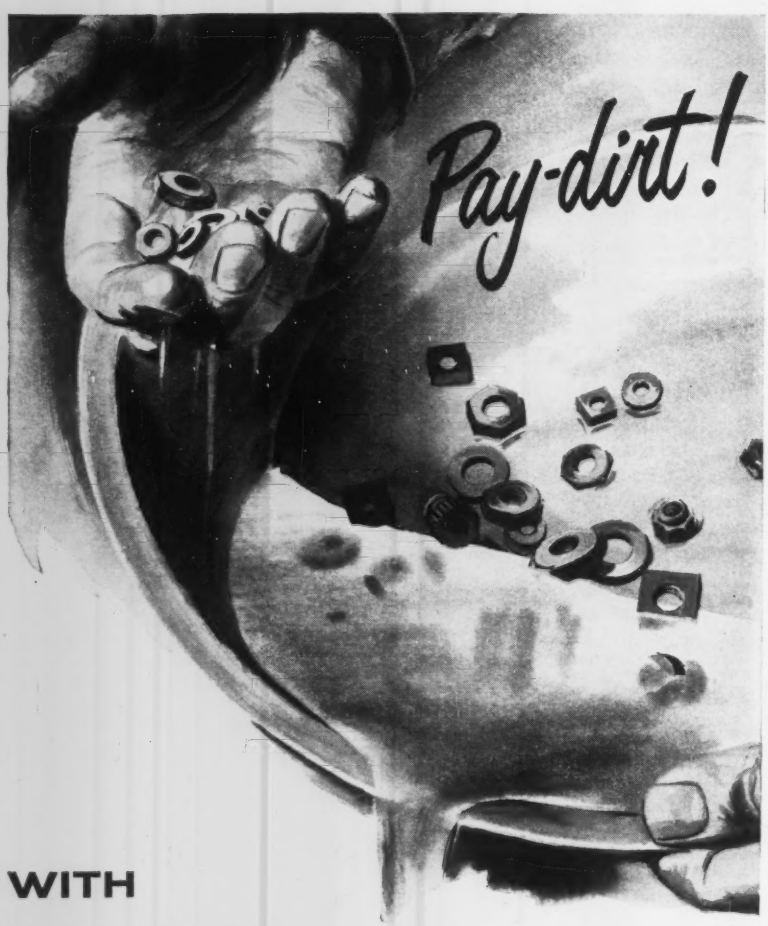
Our $194 million expansion program which will soon double our steelmaking capacity, has created opportunities in industrial engineering for young men trained or experienced in wage incentive programing, methods engineering, and statistical quality control.

2 to 5 years experience desired. Professional status assured. Openings at our Fontana plant in Southern California.

Send complete resume to
Employment Manager

KAISER STEEL CORP.
P. O. Box 217
Fontana, Calif.

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind—
Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry.
When you have an opportunity to offer, use the Help Wanted columns of STEEL.



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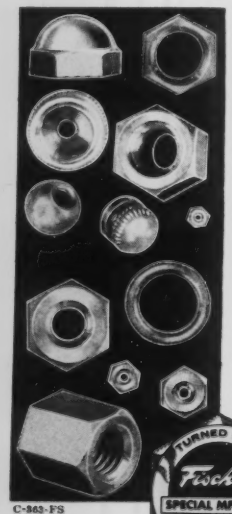
BRASS AND ALUMINUM NUTS



C-863-FS

Fischer nuts are like "pay dirt" to your production department. Whether they are everyday standards or special and odd size nuts, Fischer will produce them to your specifications from brass or aluminum.

Precision-turned on unique high-speed machinery, Fischer nuts will establish new standards of uniformity and accuracy within your plant. All of this, of course, will speed your assembly operations . . . and cut fabrication costs. There is no premium for this extra quality. Before you place your next order for brass or aluminum nuts (standard or special) send your specifications to Fischer. You'll discover it's like finding "pay-dirt".

Write today for complete information and catalog.

Fischer

FISCHER SPECIAL MFG. CO.

476 Morgan St., Cincinnati, Ohio, WOodburn 1-1280

(*Concluded from page* 185)

49.8 per cent scrap and 50.2 per cent pig iron in April.

Scrap for consumption (home production plus purchases) totaled 5,693,000 tons in the month, a decrease of 2 per cent from April. Home scrap accounted for 3,437,000 tons; purchases, 2,256,000. Eighty-three per cent of the purchased scrap was obtained from dealers and 17 per cent from other sources.

Domestic stocks of scrap held by consumers at the end of May were 6,524,000 tons against 6,536,114 at the end of April. Pig iron stocks amounted to 2,384,000 tons against 2,253,929 at the end of the preceding month.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

10,000 tons, state viaduct, FAC-56 and 7, Erie county, New York, Schacht Steel Construction Inc., New York.

160 tons, Benjamin Franklin Senior High School, Philadelphia, to the Joyce Steel Co., Wilmington, Del.; also 1200 tons of reinforcing bars placed with an unnamed seller.

STRUCTURAL STEEL PENDING

5970 tons, state bridge work, Erie county, New York, Johnson, Drake & Piper, New York, low on general contract.

3500 tons, state bridge work, Albany county, New York, Terry Contracting Co., New York, low on general contract.

2000 tons, annex to the main post office, Philadelphia; inquiry expected out shortly, with alternate calling for reinforcing bar construction.

1172 tons, state bridge, LR 443 route 20, Lehigh county, Pennsylvania; bids Aug. 16.

1000 tons, state bridge work, Saratoga county, New York, B. Perini Corp., Framingham, Mass., low on general contract.

400 tons, Eastern Joint High School, Wrightsville, Pa.; bids Aug. 1.

240 tons, three-span composite WF beam bridge, Montpelier, Vt.; bids Aug. 2, Montpelier; also 65 tons of reinforcing bars.

135 tons, angles, Raritan Arsenal, Metuchen, N.J.; bids in.

100 tons, hospital, Elkton, Md.

100 tons, warehouse addition, Container Corp. of America, Valley Forge, Pa.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1200 tons, Benjamin Franklin Senior High School, Philadelphia, to unnamed seller.

600 tons, Civil Courts Building, New Orleans, to Orleans Material & Equipment Co., New Orleans; R. P. Farnsworth Co., New Orleans, general contractor.

565 tons, office building, Asylum Avenue Corp., Hartford, Conn., to the Bethlehem Steel Co., Bethlehem, Pa., through A. E. Stephens Co., Springfield, Mass., general contractor.

345 tons, Edwin W. Broome Jr. High School, Rockville, Md., to the Ceco Steel Products Corp., New York, through J. D. Hedin Construction Co., Washington; also 95 tons of structural steel to the B. & M. Welding & Iron Works Inc.

REINFORCING BARS PENDING

575 or 330 tons (depending on prestressed or conventional) Oregon state bridge structures, near Albany, Oreg.; two schedules; bids to Portland, Oreg., Aug. 8.

345 tons, addition, New Jersey State Hospital, Trenton, N.J.; bids asked.

270 tons, also 20,830 linear feet of sheet piling, substructure and piles, state bridge, Windsor-Windsor Locks, Conn.; bids July 29.

250 tons, Corps of Engineers, San Francisco; bids in.

225 tons, Corps of Engineers, Chicago; bids in.

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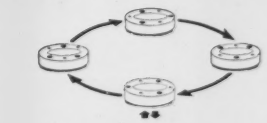
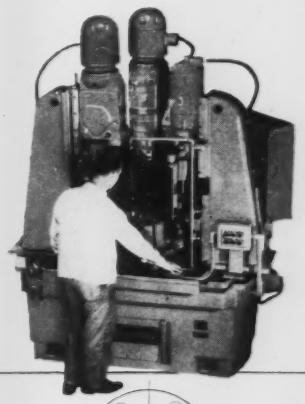
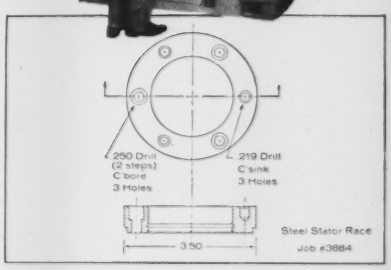






This Kingsbury indexing automatic performs these three operations on 290 steel stator races per hour (gross). Three vertical operating units have multi-spindle auxiliary heads. All tools have guide bushings to maintain accuracy. An air cylinder actuates the clamp.

Simple (like this) or complex, a Kingsbury is the best indexing automatic you can buy:

it will be fully tooled, ready to produce

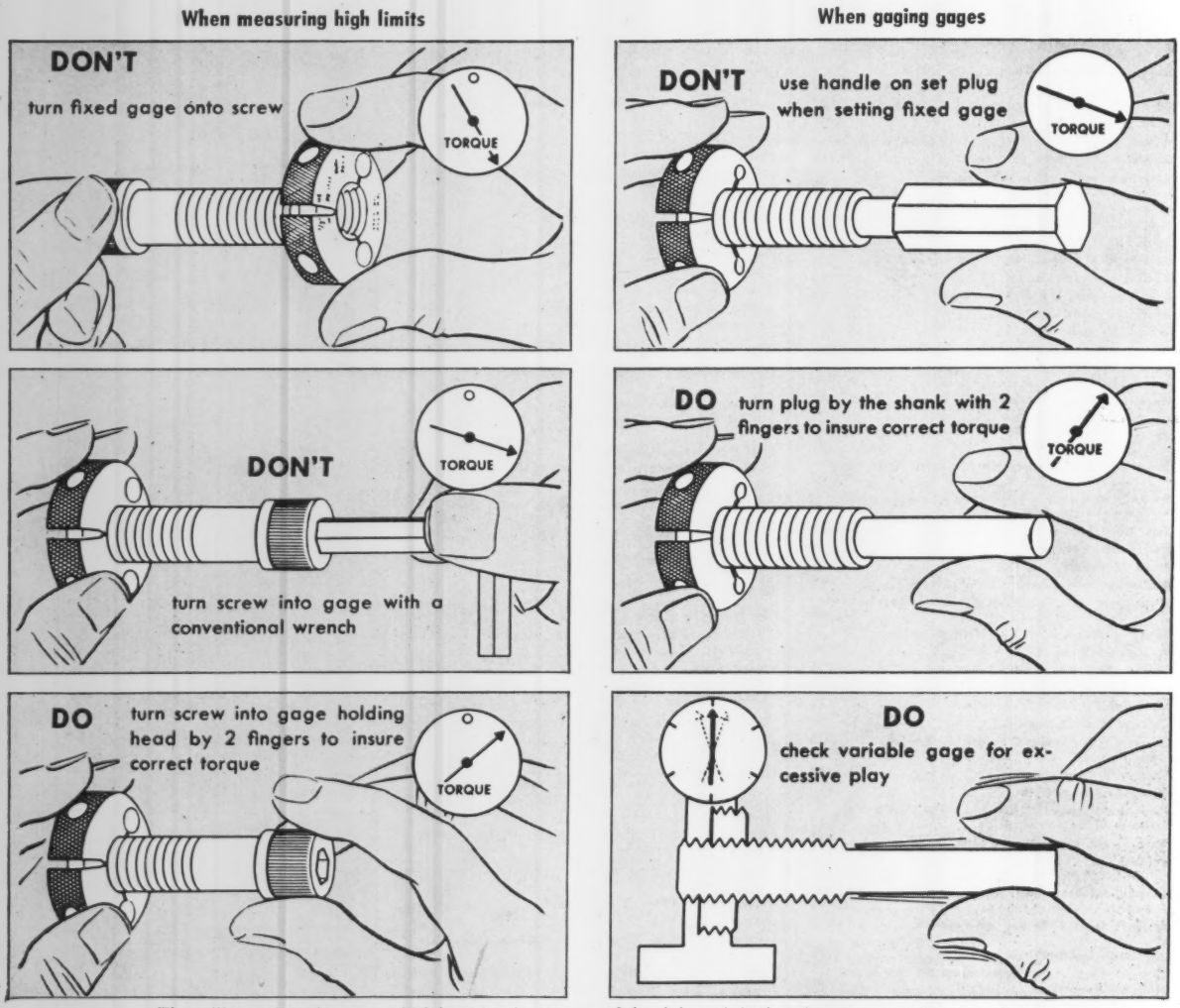
it will meet your specifications for accuracy and production rate

it will pay for itself in a matter of months

We have designed, built and tooled thousands of automatic drilling and tapping machines. It is our only business. May we come see you? Kingsbury Machine Tool Corporation, Keene, New Hampshire.

KINGSBURY

INDEXING AUTOMATICS for high production drilling and tapping



These illustrations from new SPS booklet show some of the do's and don'ts of gaging precision threads.

3A threads: what they are; how to gage them — new SPS booklet tells all

Threads made to Class 3A fit are the most precise in general use in industry. But you do not always get the 3A precision you specify. Because of many different gaging techniques that yield varying results, screws with threads well outside the Class 3A tolerance limits often pass inspection.

SPS has prepared a new booklet on this subject. It explains clearly what Class 3A threads are and the pros and cons involved in the widely varying gaging techniques in use today. It reviews the gaging of high and low limits of 3A threads, sampling techniques, and even the methods of gaging gages.

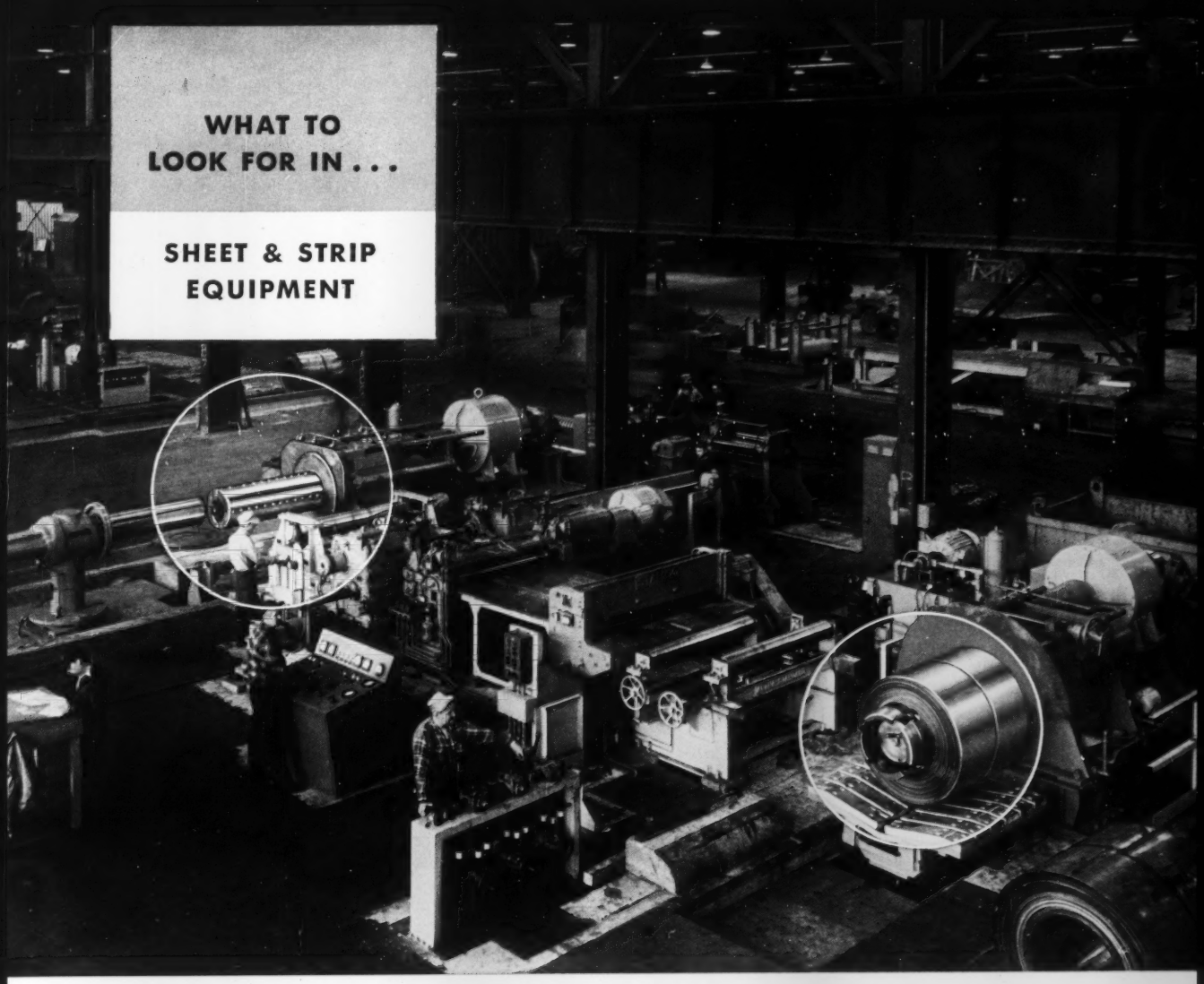
All standard UNBRAKO socket screw products fall within specified tolerance limits *no matter what method is used to gage them.* Leading industrial distributors carry complete stocks. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 33, Pa.

Form 2239, "Class 3A Threads: what they are; how to gage them." 16 pages, with many illustrations. Write for free copy today.

STANDARD PRESSED STEEL CO.

UNBRAKO® SOCKET SCREW DIVISION SPS

JENKINTOWN PENNSYLVANIA



there's a DIFFERENCE IN REELS

Balanced Drum Segments, interlocked and chrome plated to prevent scoring of drum.

Shafts mounted in anti-friction bearings with ample thrust and radial load capacity.

Hydraulic traversing and elevating coil carriage.

Coil Stripping Device (Tension Reel) prevents telescoping of coil.

OPERATOR EASE: Adequate drum expansion permits loading or unloading coils easily Hydraulically operated strip aligner permits 6" movement either side of center line of line. Automatic Gripper Bar on Tension Reel grips strip from minimum to maximum without adjusting. Suitable for either over or underwinding of strip. On Payoff Reel, patented coil centering by adjustable stop plate supported by two round steel racks . . . easily adjusted with handwheel. Indicator gives operator a clear view of strip width.

EASY MAINTENANCE: Oil Seals of special split design for drive housing; circulating oil system for drive with separate motor drive. Balance of unit easily serviced by accessible fittings or centralized lubrication system.

GOOD DESIGN: 4-segment Drum provides more contact with coil I.D. The Tension Reel starts winding any coil in an almost perfect circle. Aetna's design of reels puts minimum unit pressure on sliding shoes when full weight of coil is on the drum.

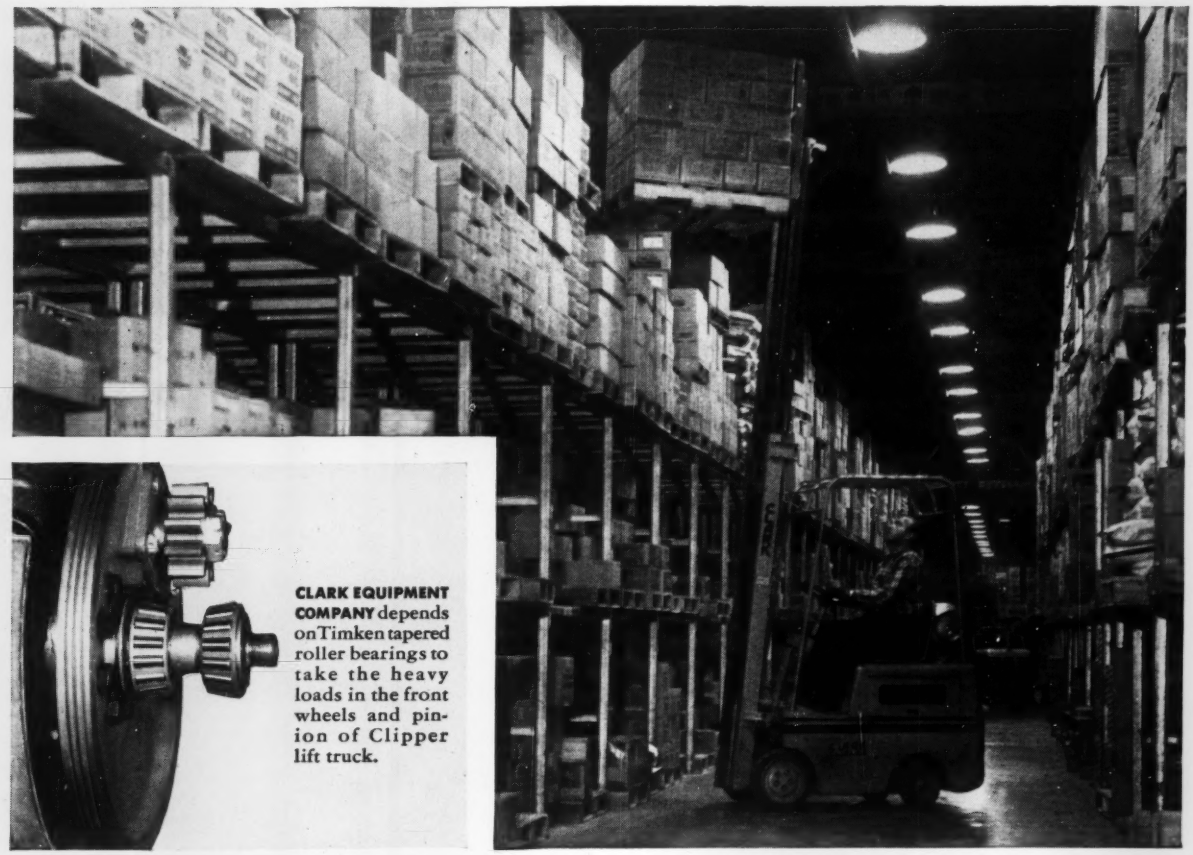
RUGGEDNESS: Helical Gear Drive—quiet and smooth, strong, less weight; heavy structural steel weldment with machined ways provides a rugged strong base for high speeds without vibration

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



CLARK EQUIPMENT COMPANY depends on Timken tapered roller bearings to take the heavy loads in the front wheels and pinion of Clipper lift truck.

Lifts 2,000 lbs. high above the floor—but the load's below...on TIMKEN® bearings

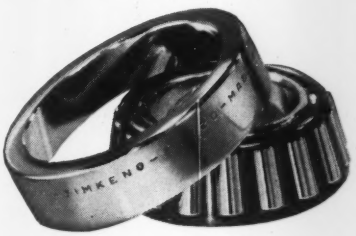
EVERY time this rugged little Clipper lift truck—made by Clark Equipment Company—grabs 2,000 lbs. off the floor and sets it on a top tier, terrific load is placed on the front wheels. And every time the machine makes a sudden start or stop, there's load on the pinion. But the wheels and pinion roll the load on Timken® tapered roller bearings. Timken bearings are tapered to take radial and thrust loads in any combination. No additional thrust devices are needed. The Clipper keeps clipping along.

Timken bearing rollers and races are case-carburized to give hard, wear-resistant surfaces over tough, shock-resistant cores. With full line contact between rollers and races, Timken bearings give extra load-carrying capacity, keep the machine on the go with less maintenance.

Timken bearings are precision-manufactured, under rigid quality controls, to meet their geometrical design—the design which gives true rolling motion, practically eliminates all friction. To insure highest quality we make our own alloy steel; no other American bearing maker does this.

When you build or buy machines of any type, do as Clark Equipment Company did for the Clipper: insist that the trade-mark "TIMKEN" be on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



TIMKEN *TAPERED ROLLER BEARINGS ROLL THE LOAD*

TRADE-MARK REG. U. S. PAT. OFF.